The Veterinary Record

FOUNDED BY WILLIAM HUNTING, F.R.C.V.S., 1888.

No. 48. NOVEMBER 30, 1935. VOL. XV.

General Article

THE RADIOLOGY OF NAVICULAR DISEASE, WITH OBSERVATIONS ON ITS PATHOLOGY*

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INTRODUCTION

It is now about 25 years since, with a view to applying the science of Radiology to the diagnosis of equine diseases, an X-ray apparatus was first installed at the Royal Army Veterinary School. From time to time attempts were made to exploit this method of diagnosis, but no results of any practical value were achieved and radiographs of the horse's foot could not be made.

It was not until 1929, when Major A. A. Pryer, D.S.O., R.A.V.C., interested himself in this work and succeeded in obtaining more modern apparatus, that radiographs of the horse's limbs and feet having diagnostic value were obtained. His researches in this direction laid the foundation of the present Radiological Department, of the services of which Army Veterinary Officers almost daily avail themselves.

Four years ago the writer had the privilege of succeeding Major Pryer at the Royal Army Veterinary School and of continuing the research from the point where Major Pryer had relinquished the task. During this period 1,345 radiographs of equine subjects have been taken, interpreted, and reported upon; and, in addition, a great number of experimental exposures have been made. Although all parts of the limbs, from the shoulder and stifle joint downwards, have been successfully radiographed, most of the work has dealt with the equine foot, the primary object being to examine the navicular bone.

The adaptation of ordinary X-ray technique in order to obtain radiographs of a uniform standard sufficiently high to allow of the recognition of early lesions in navicular bones, has been achieved only after a great amount of experimentation.

Lack of literature in connection with the interpretation of radiographs of the horse's foot has necessitated direct observation, in order to understand the significance of the various shadows seen on the films. This has been done by the only possible, although slow and laborious, method of making *post-mortem* examinations of the feet of every horse which had been radiographed at some time previous to being destroyed, and correlating the *post-mortem* and X-ray findings. In this way much information in connection with interpretation has been accumulated.

All X-ray films, interpretation reports and, in cases destroyed, the pathological records, with photographs of the fresh navicular bones and adjacent structures, have been preserved: also, in many cases histological sections of the navicular and other digital bones have been made.

The unique facilities available in the Army Veterinary Service for obtaining such a mass of material and also for having access to the previous history of all horses since they became Government property, suggested the placing on record of these observations on the radiology and pathology of navicular disease.

PART I—RADIOLOGY

The usual apparatus procurable from the manufacturers can, providing it is capable of producing a sufficiently high X-ray output, be adapted for the successful radiology of the horse's foot. A description of such apparatus would involve a dissertation on X-ray physics, a subject which is neither original nor within the scope of this thesis. It might be opportune to remark, however, that a working knowledge of this subject is a great asset to the radiologist and a necessity to those engaged on pioneer work.

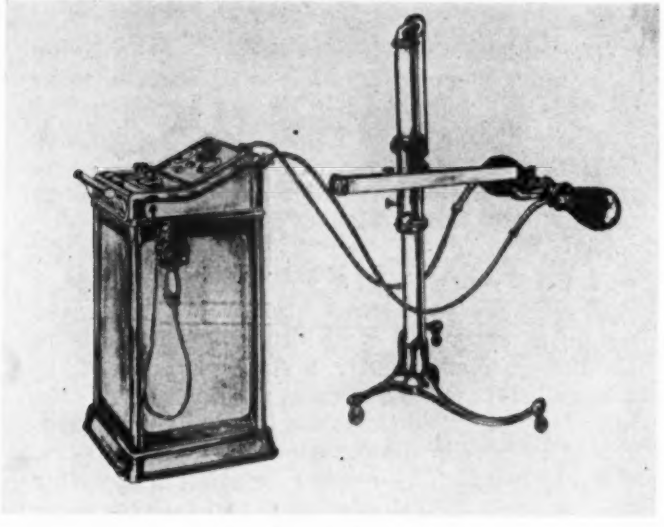
Although the ordinary X-ray apparatus is suitable as a basis for equine radiology, it must be specially adapted and applied for this work. Many of the necessary modifications have been devised as a result of experience gained and experiments conducted at the Royal Army Veterinary School and will therefore be described.

Some means of radiographing the horse's foot had to be adopted which would obviate the necessity for casting, and allow of the subjects being photographed in the standing position. It was soon realised that few horses could be manœuvred into an exact position within a few inches of an X-ray set, as would be necessary when using the human type of apparatus. In

* Thesis submitted for the Fellowship Diploma of the Royal College of Veterinary Surgeons. Fellowship conferred October, 1935.

addition, the risk of costly damage would be considerable. The tube was therefore mounted on a small stand fitted with rubber wheels, and connected to the transformer by long cables. The tube-stand can be wheeled up to the patient, which has already been placed in position, in most cases without causing any alarm. The extreme mobility of the tube-stand enables it to be rapidly removed in case a horse becomes refractory, a tribute to its efficiency in this respect being the fact that in no case during nearly 2,000 exposures executed by the writer has the apparatus been damaged by a patient. A further advantage of the tube-stand being separated from the transformer is that the sound occurring when the high tension is applied is remote instead of being immediately beneath the animal's head, thus avoiding loss of time and material caused by movement.

The photograph illustrates a set specially designed to meet with the requirements of equine radiology.

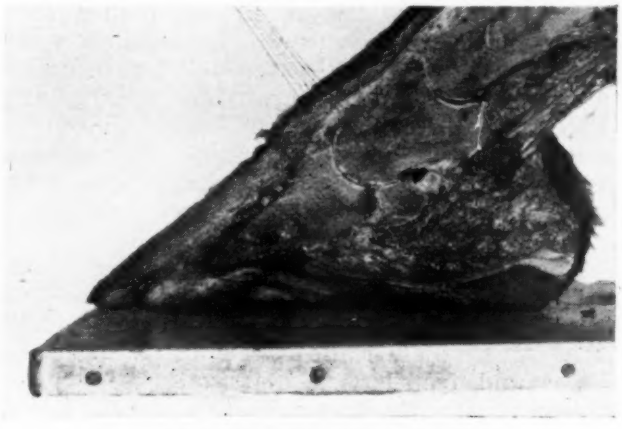


X-Ray Set Suitable for Veterinary Radiology

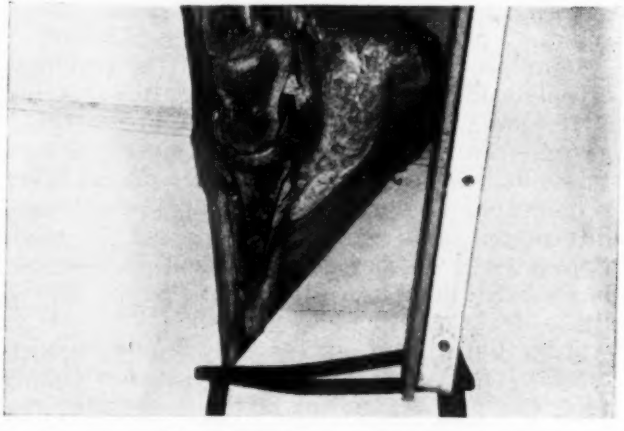
It is a principle in radiology that, whenever possible, the X-ray beam should pass through the object and impinge on the film at a right-angle, thus reducing distortion to a minimum. This principle cannot be strictly complied with in radiographing the horse's foot by the method of directing the rays through the navicular bone from the coronet and on to the film on which the horse is standing. This method was, however, used until recently for all pedal radiology, because it was the only one in which clear pictures could be obtained of the navicular bone, the slight distortion being recognised and allowed for in interpretation.

The anatomical situation of the navicular bone is such that, in using this so-called "high coronary route," the rays pass through it at a right-angle, but strike the film much more acutely.

The only way to attain perfection in this respect is to tilt the foot so that the toe is resting on a stand and the heel raised sufficiently to allow the width of the navicular bone to lie parallel to the film, which is held behind the solar surface of the foot. This leaves a considerable space between the foot and the film; and this space was found in practice to be responsible for so much scattered radiation that the radiographs were useless. It was therefore abandoned. Recent work, which will be discussed later, has overcome the difficulty of "scatter" and has made the upright pedal position practicable. This technique is being brought into regular use.



High Coronary Route



Upright Pedal Route

To obtain a radiograph of the navicular region the X-rays must pass through the solar surface of the foot. This surface is of very irregular thickness and density, this being due to the presence of the horny frog, the central sulcus, and the collateral sulci between the frog and the bars. In these clefts the X-radiation meets with less resistance than in the thicker parts of the sole and consequently reaches the film in greater concentration, with the result

that black lines approximating the clefts appear on the negative. Unfortunately, these marks pass directly over the outline of the navicular bone and may easily mask evidence of disease or, on the contrary, may, in some cases, if one lacks experience in this direction, be erroneously interpreted as evidence of disease. This difficulty, of considerable importance, was overcome originally by Pryer, who conceived the remedy of filling the clefts with a paste made from horn shavings and lard. This mixture appears to offer approximately the same resistance to radiation as horn, and when the filling is done effectively the marks are in most cases absent, though a number still retain a few in a much reduced form. A modification of the horn paste has recently resulted in a more uniformly reliable material: the horn raspings are now dried slowly in an incubator for several weeks and then reduced to a powder before amalgamating them with melted lard.

The successful radiographing of the equine foot, like that of other parts, depends on the correct combination of certain factors, such as voltage or tension applied, milliamperage, distance of the object from the tube, and the time of exposure of the film to radiation. The particular setting of these factors has to be determined, by trial and error, for each tube. However, the variation of X-ray output is not great in modern tubes.

The calibrations which give the maximum efficiency for the apparatus used by the writer are as follows:—

When operating without a grid

Potential Voltage ...	65 Kilo Volts Peak
Amperage	35 Milliamperes
Time of exposure ...	1 Second
Distance of the object from the tube ...	27 to 30 in.

When operating with a grid

Potential Voltage ...	75-80 Kilo Volts Peak
Amperage	38 Milliamperes
Time of exposure ...	1 Second
Distance of the object from the tube ...	27 to 30 in.

It is found that the exposure time is the only factor which need be varied. Although one second is suitable for feet of average size, it is necessary to increase this to a maximum of one-and-a-half seconds when the feet are exceptionally large. This point can only be decided by the operator. It is recommended that the above settings be taken as a standard from which the point of maximum efficiency of each tube is obtained by experiment.

Although only a particular calibration will give the ideal picture, the latitude of variation of the various factors in the case of parts other than the foot is considerable, and within fairly wide limits radiographs which are quite interpretable can be produced. This, however, is not the case with the horse's foot, where there can be very little latitude if films are to be interpreted with confidence. This apparent anomaly can be explained quite simply as follows: No matter in which way an X-ray picture of the navicular bone, showing the full range of its broad surface, is taken, the rays must pass through the short pastern bone before impinging on the film, and consequently the navicular is shown in relief behind the second phalanx. If the X-rays should lack velocity—which would be the case if the voltage applied to the tube were too low—they would not penetrate the navicular bone in addition to the second phalanx, and the result would be a negative on which the former would appear as a bright white outline devoid of detail. In this case shadows resulting from the altered density in a diseased bone would not appear and the condition would be unrecognisable.

If, on the contrary, the voltage or tension applied should be too high, the penetration would be such that the X-rays would pass through the normal parts of the bone with almost the same facility as through the diseased parts and the shadow of the decalcified areas be consequently lost. This would happen particularly if the shadow were a faint one, as is always the case in the incipient stages.

These factors must therefore be adjusted with precision, or an error of diagnosis may result. Fortunately, the appearance of the negative indicates the correctness or otherwise of the degree of penetration. Generally speaking, the higher the primary voltage applied by the operator the higher will be the potential voltage which actually enters the X-ray tube and the greater will be the velocity and concentration of the X-ray output.

Within certain limits there is a definite relation between the X-ray output value and the time of exposure of the film; the higher the former, the shorter is the time of exposure necessary to obtain radiographs.

The tension must, however, always be sufficiently high to give the necessary penetrating power to the rays in order to enable enough of them to pass through the object; otherwise all the radiation is absorbed and none reaches the film, the result being that practically no impression is left on the film irrespective of the length of the exposure.

Long exposures are always a disadvantage, particularly with animal patients, where movement is difficult to control; and there is the additional danger of X-ray injury from excessive irradiation. For this reason every effort has been made to reduce the exposure to the minimum time, this being achieved partly by manipulating the electrical factors, but more particularly by the use of intensifying screens

between which the film is placed before exposure.

The writer has recently succeeded in applying a technique of pedal radiology which admits of the foot being X-rayed by the upright pedal route with an exposure of one second. (Appendix Part I.) This is made possible by adopting a "grid system," described later, which enables a higher tension than previously to be used.

The equine foot with its unique construction presents a difficult radiological problem, for, in addition to bone of considerable thickness, the X-rays have to traverse such structures as tendon, fibro-fatty frog and finally a thick layer of horn. Apart from such a solid mass necessitating a comparatively high voltage to produce X-rays of sufficient penetrating power, the variety of density through which the rays have to pass tends to deflect some of them from the straight line, and they therefore strike the light-sensitive film at a point remote from the one intended. This is termed "scattered radiation," and results in a blurred negative which lacks detail and clarity, the extent of the blurring depending on the amount of scatter.

It is well known that scattered radiation increases enormously with the radiation excited at the higher tensions, and, as such tensions are necessary to penetrate the horse's foot, this menace has always been present.

In the past the difficulty has been partially met by sacrificing voltage and increasing exposure—by which means scatter has been reduced but never removed—and the radiographs have suffered proportionately. Herein lies the explanation of the constant inferiority, in clarity and detail, of foot films to those of other parts of the limb.

This difficulty has been under investigation by the writer for several years; and it was at first thought that the Potter Bucky Diaphragm, commonly used in human radiology, would solve the problem. It was found, however, to be much too cumbersome and fragile for use on the horse's foot and, furthermore, its cost is prohibitive for practical purposes.

Recently the Lysholm Grid was suggested to the writer by Messrs. Watson & Sons, of London, as having a possible application in equine radiology, and a model was obtained for testing. This appliance consists of a large number of lead strips placed in parallel, half-a-millimetre apart. The strips are fixed and covered by some ray-transparent material. The grid is placed immediately in front of the film cassette and must be at right-angles to the X-ray beam, which therefore passes through the grid after leaving the foot and before reaching the film. The bulk of the straight rays pass between the lead strips, but those which have deviated strike the grid at an acute angle and are absorbed by the lead strips. It was found on testing to remove almost all scatter and to allow a higher and more suitable tension to be applied. A slight disadvantage of the grid is that the negative is very finely lined, but this does not affect interpretation and is entirely outweighed by the greater clarity and quality of the radiographs obtained.

This appliance cannot be used when the high coronary route is adopted, because it would be damaged by a horse standing on it, which would be necessary by this method. The important point, however, is that by its use the upright pedal route becomes possible, since the scatter, which was the only reason for its abandonment, is removed, and excellent radiographs without distortion can be obtained.

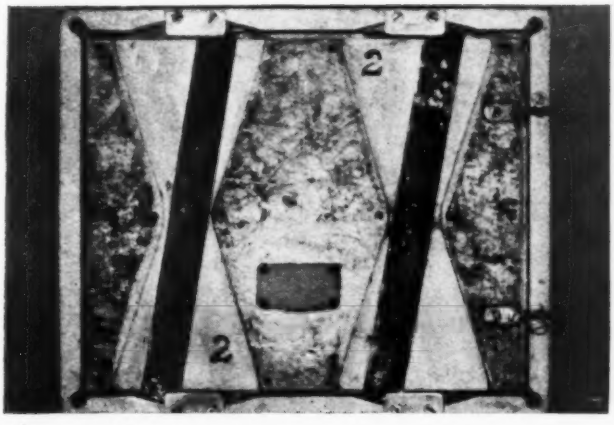
The Lysholm Grid can be obtained in various sizes according to requirements, the size 10 in. by 8 in. having been found suitable for the horse's foot. It has no moving parts and is not cumbersome, being rather like a piece of thick cardboard. Furthermore, the cost is comparatively low and brings it within the realm of economic practice. The photograph of the upright pedal route shows the grid in position. The clearing-up effect is most marked when it is used.

From an economical point of view the size of the films used merits discussion, because not only does the cost of the films increase with size, but also the price of cassettes, intensifying screens and development increases in the same ratio. A film measuring 10 in. by 8 in. has proved to be the most suitable size for the foot, as all structures, including all the short and part of the long pastern bones, are included.

A smaller size can be used if the navicular region only is to be radiographed, but this is not recommended as it is generally necessary, and always advisable, to examine all the structures in the digits in cases of suspected navicular disease.

The anxiety of storing large numbers of films made of highly inflammable material has recently been overcome by the introduction of non-inflammable nitrate films. Critical tests were made before these were introduced into general use at the Royal Army Veterinary School, and, photographically, they are in no way inferior.

Any ordinary cassette or film-container is suitable for radiographing the foot if the radiograph is taken by the upright pedal route (in which case the cassette is not subjected to pressure), but when the high coronary route is adopted, the cassette must be capable of sustaining considerable weight, as the patient is made to stand on it. For this purpose a specially strong aluminium cassette is employed, which is further strengthened by fixing aluminium plates four millimetres thick on the under surface.



Reinforced Cassette

Whatever the method of reinforcing the cassette, it must be such as will definitely protect the intensifying screens inside from indentation, since an injury to the latter may be responsible for false shadows, which are capable of misinterpretation.

Intensifying screens have been previously alluded to; without them the long exposure necessary would make equine pedal radiology almost impracticable.

In our efforts to obtain better results many different types of intensifying screens have been tested, and it has been found that there are no material differences, in their respective efficiency, between the products of reputable firms. Those of foreign manufacture certainly do not justify the additional price demanded for them.

From whatever source the screens originate, it is advisable to make certain that each sample is unaffected with "afterglow" or "lag." This is a defect periodically encountered which causes the screens to retain the fluoroscopic character excited by irradiation, for a variable time after it has ended. The effect of this is to continue exposure for an unknown period, thus removing exposure time from complete control. In addition, when consecutive exposures have to be made it is quite possible for the "afterglow" to persist until the cassette is reloaded with a new film which becomes impressed with part of the image of the previous exposure. Apart from this being tiresome and causing loss of time and material, it is quite possible for it to lead to an error in diagnosis.

The screens can be tested by simply giving them a fairly long exposure to radiation and then placing an unexposed film between them for a short period. If "afterglow" exists it will be apparent when the negative is developed.

The technique of radiography applied to the horse's foot has now reached a stage when delicate details of osseous changes in the navicular bone can be recognised whilst clinical signs of navicular disease are still indefinite. This fact is being regularly established by *post-mortem* examination on horses destroyed after X-ray diagnosis. It is true that the very early bone lesions may give evidence on a radiograph which demands expert interpretation, but this is not remarkable when the highly specialised nature of this science is considered. As the disease advances the more graphically is its effect shown radiographically, and the simpler becomes the interpretation.

The definite clinical diagnosis of navicular disease in the incipient stage is usually impossible, and in the moderately advanced stage it amounts to a conjecture based on collective symptoms which are very irregular in degree. Even in advanced cases where the symptoms strongly suggest navicular disease, radiological evidence of its existence is always welcome to the clinician before advising destruction of the patient.

Navicular disease must have reached a stage where osseous changes have commenced before its existence is recognisable on a radiograph. The earliest change evident is a tendency to decalcification of the bone, giving the appearance on the negative of an almost imperceptible shadow, generally towards the centre of the bone. This shadow has no definite line of demarcation but merges into the surrounding bone. Its recognition requires a practised eye which appreciates the radiological appearance of normal density.

In some cases decalcification commences round the nutrient foramina, which appear towards the lower edge of the bone in a negative. They are larger and more irregular than normal and give *prima-facie* evidence of the onset of disease.

A feature occasionally noticed in early cases where decalcification has commenced is a blurred upper border of the navicular bone, which has been seen to clarify at a later examination. A possible explanation of this is that some of the calcium lost by the bone enters the synovia in the navicular bursa, making it slightly ray-opaque.

Although the significance of these early X-ray appearances has been frequently verified at autopsies, it is the usual custom to indicate their existence and recommend another X-ray examination at a little later date, when in most cases the diagnosis can be made with certainty.

In one case the film showed early evidence of decalcification and a second film, the same foot taken a few months later when the lesions had advanced to a degree when, although the carious stage had not been reached, diagnosis could be made with confidence. At the autopsy the navicular bone in this case had a very slight erosion of the fibro-cartilage on the tendon surface with commencing rarefaction of the bone beneath it.

With the advancement of the disease the decalcification develops into caries and actual

cavities exist in the bone. The radiological appearance naturally varies with the extent of the caries, but when present it is quite unmistakable and appears as a well-defined dark shadow with an irregular outline, but often with a tendency to be circular and, in the majority of cases, in the centre of the navicular bone.

The films reproduced are a few representative examples which disclose shadows of varying degree. All these cases were found on *post-mortem* examination to have cavity formation.

Instances have been observed where the disease appears to be confined to the outer layer of the flexor surface and manifests itself as a superficial necrosis only, which, in some cases, may cover a considerable area of the bone surface. The radiological appearance of this type may present some difficulty because cavities do not exist and consequently there are no well-marked shadows on the radiograph. Critical observation will, however, show an uneven density of the bone, and, if at all advanced, it is likely to be accompanied by an irregularity of bone outline.

Evidence of decalcification of the compact layer of bone on the tendon surface of the navicular bone is often demonstrated in radiographs taken in the lateral direction. This is not a suitable method for diagnosing very early cases, but it has proved valuable to the writer occasionally in the more advanced cases as a means of confirming a diagnosis made by the usual method.

The shape of the navicular bone is of great importance in the interpretation of radiographs, and it is generally an easily recognisable feature. It is, however, not always a simple matter to determine whether a particular outline is diagnostic of disease, because the shape of normal bones varies within rather wide limits, a fact which is particularly obvious to those of us who examine equine feet radiographically almost every day.

The outline of a normal navicular bone, whatever its nature, is always symmetrical and gives an impression of being balanced, whereas when the shape has been acquired as a result of disease the symmetry is usually lost. Reference to the X-ray appearance of the navicular bone of the opposite foot is often a great help in the case of a bone of peculiar shape, because if both bones are alike and symmetrical it is unlikely, if there is no other evidence of it, that disease is responsible for the outline.

The upper border of the navicular bone may have X-ray appearances which are diagnostic of abnormality. Bony deposits are commonly seen on the film as outgrowths more or less defined according to the density of calcification. In the writer's experience all osteophytes of the navicular borders have been associated with navicular disease in one stage or another, and are considered to be a manifestation of this condition. There is, however, no reason to assume that the navicular bone is immune from the osteo-arthritic deposits seen in other situations and arising from mineral imbalance or endocrine derangement; but such have not been encountered.

The extremities of the upper border very commonly show the presence of bony outgrowths, which were first described radiologically by Pryer and appropriately called by him "spurs." In all cases which have come under the writer's observation, the existence of "spurs" has been associated with some degree of navicular disease and, when present, they are considered to be diagnostic in radiographic interpretation. They vary from a small extension of the extremities to a large hook of bone, and in every case the spur curves upwards in the direction of the fibres of the ligament attached to the navicular bone at this extremity.

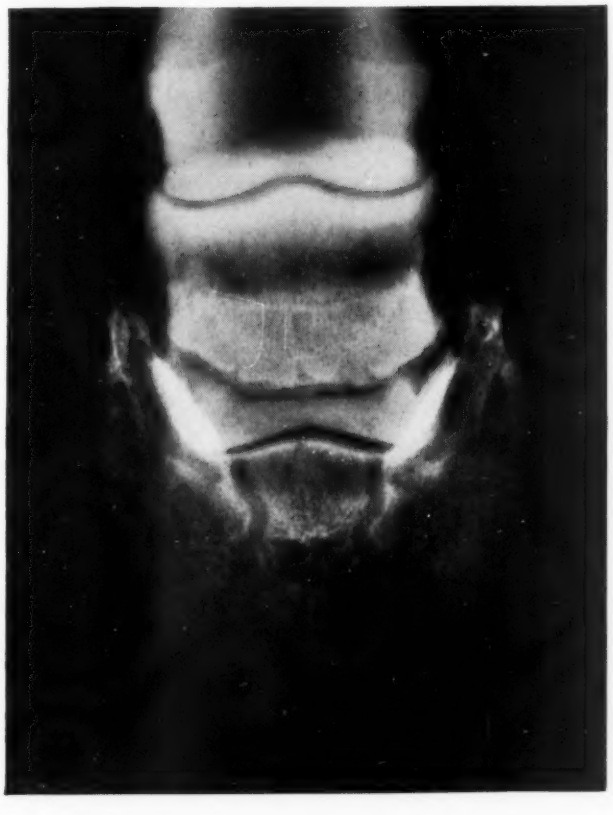
Rarefaction of the upper border of the navicular bone was formerly a frequent observation in X-ray reports, and was doubtless in many cases a misinterpretation since the *post-mortem* evidence has rarely confirmed it. The explanation of this fallacy is that, in a normal navicular bone the flexor surface extends a little higher than the anterior surface and consequently presents, along the upper border, a comparatively thin rim of bone which is more easily penetrated by the X-rays than the remainder of the bone, giving an appearance of decreased density on the film. Obviously the extent of this rim will vary, within certain limits, with any alteration in the direction of the beam, a factor which is influenced by the position of the foot when radiographed. With practice this rim of decreased density in normal bones can be easily distinguished from the rarefaction of disease, which usually extends into the thickness of the bone. The latter condition, in the writer's experience, instead of being common, as formerly considered, is exceedingly rare.

In certain circumstances the posterior limits of the lower articular surface of the os coronæ are in a plane which makes the bone appear continuous with the upper border of the navicular bone, giving the latter the radiographic appearance of being abnormally wide with uneven density. This can easily be obviated by slightly increasing the angle of the X-ray beam and so separating the image of this ridge from the navicular picture.

Although increase of width of the navicular bone may occasionally occur as a sequel to disease—and it is a feature very apparent on a radiograph—it should not be considered diagnostic without great caution. This is particularly the case when other evidence of disease,

Radiograph showing well-marked carious shadows in the navicular bone.

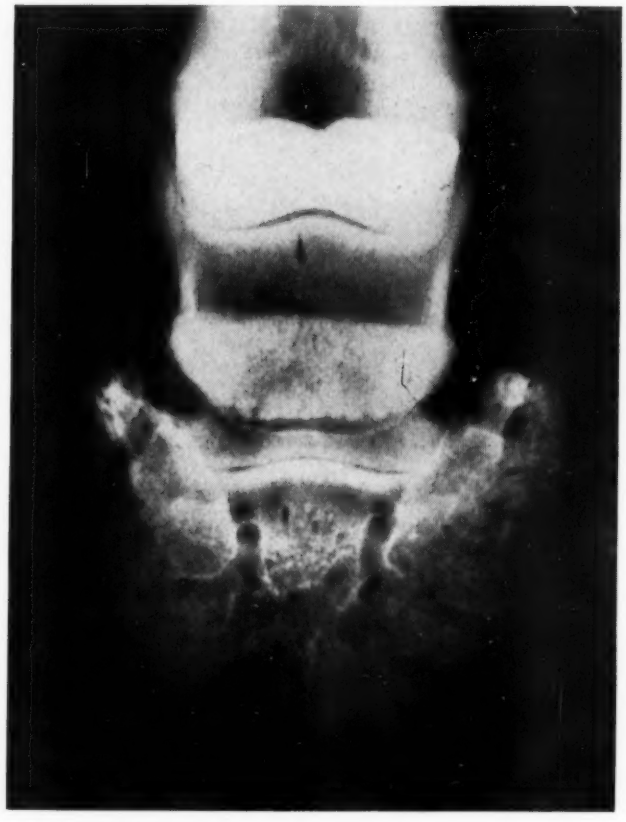
Radiograph showing decalcification of the navicular bone and osteophytes on its upper border.



Radiograph showing an exceptionally large osteophyte on the upper border of the navicular bone.

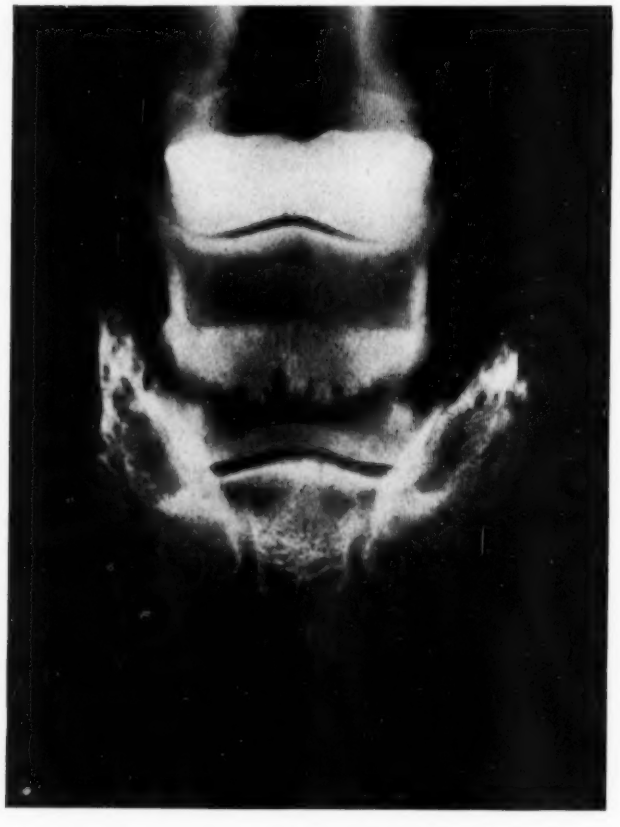
Radiograph showing two well-marked carious areas in the navicular bone.

Radiograph showing caries of the navicular bone, with irregular upper border from osteophytes.



Radiograph showing advanced decalcification of the navicular bone and ostitis of the pedal bone.

Radiograph showing a carious shadow in an unusual situation in the navicular bone.



Radiograph showing enlarged nutrient foramina, with a carious area, and spur formation.

such as decalcification, spurs, or loss of symmetry, is wanting.

The reason for this allowance in interpretation will be obvious when it is realised that, owing to distortion, the width on a negative of a navicular bone varies to some extent with the angle at which the X-ray beam penetrates the bone before impinging on the film. The mechanical factors for maintaining the X-ray beam at a definite angle can be made constant, but the difference in size, shape, and consequent angle at which the navicular bone rests in different feet, cannot be controlled.

Width distortion is, however, almost entirely eliminated when the recently perfected upright pedal route of irradiation is adopted.

In the foregoing remarks on the radiographic appearances in navicular disease, some of the difficulties which periodically arise in the interpretation of films have been mentioned. It may be advantageous to summarise the errors which are likely to be made in reading radiographs of the navicular region. These can be conveniently classified as follows:—

(1) Errors due to attaching pathological significance to shadows which are not caused by diseased conditions.
(2) Failure to recognise the shadows of abnormalities which exist on a negative, or to be misled because, through incorrect technique, the shadows of existing abnormalities are absent.

In the first class the commonest error is caused by dark lines, resulting from incomplete filling of the frog clefts, appearing across the centre and extremities of the image of the navicular bone.

In most cases these shadows extend beyond the limits of the navicular bone, and if this point is realised there is no further doubt as to their origin. Occasionally, however, cleft shadows are limited to an area within the navicular outline and can only be differentiated from the shadows of decalcification or caries by their character. The shadows of disease always have a tendency to be circular; the borders are not well defined and merge into the surrounding bone; whilst those arising from the frog clefts have the appearance of narrow lines, one or more in number, with well-defined edges and no tendency to merge into the surrounding bone.

Cases may occur in which the cleft shadows are superimposed on those resulting from navicular disease. In such instances it is often possible to recognise the presence of the two shadows, but interpretation is very complicated, and the radiograph should be repeated after the clefts have been carefully refilled.

The shadows arising from the lateral clefts pass over the navicular bone towards its extremities. They are usually wider than those from the central clefts, and may give the appearance of decalcification of the navicular extremity. These shadows have very definite borders, and, as they nearly always extend beyond the navicular outline, an error from this source may be avoided if these points are observed.

An abnormal cavity in the short pastern bone, which is in line with the navicular bone will cast a shadow on the latter identical with that arising from navicular caries, from which it cannot be distinguished unless the shadow extends beyond the navicular margin. A radiograph of the digit taken in the lateral direction would differentiate the two conditions. Fortunately cavity formation in the short pastern bone is so uncommon as to be almost negligible, and therefore a lateral radiograph in addition to the one usually taken in foot cases is not warranted.

Film marks from extraneous sources may possibly lead to errors in reading radiographs, but the difference in character of such marks from disease shadows makes mistakes of this kind unlikely. The most common causes of film marks are damaged intensifying screens, and foreign matter on the films or screens. Marks may be caused also by air bubbles being present on the film surface whilst it is in the developing tank, and by careless handling of the film before it is dry.

Any movement of the patient during the exposure may give rise to double impressions on the film, the resultant marks sometimes resembling spurs or osteophytes. It is always advisable to repeat a radiograph which shows evidence of movement.

In the second class of possible errors in interpretation the majority are due to reading films in which the penetration was insufficient. This is caused either by under-exposure or by the application to the tube of a voltage which is too low.

In a film in which the navicular bone is not completely penetrated the shadows of the disease will not be evident. The presence of the bone detail and particularly the clarity of the nutrient foramina of the navicular bone is evidence of complete penetration. If penetration is carried too far by over-exposure or too high a voltage the film becomes so black that the shadows of an abnormal condition are masked.

Lack of contrast on a film caused by incorrect balance between voltage and amperage, may be responsible for the failure to recognise the shadows of the disease; movement and scatter may have a similar effect.

These errors are directly due to attempting the interpretation of poor films which are the result of improper technique.

The very faint shadows of incipient disease are only recognisable in films of good quality and even then present considerable liability to error—a liability which can only be overcome by experience.

The above-described radiological features

present in navicular disease have made possible the diagnosis of the disease often before it is suspected clinically. If advantage can be taken of the constant improvement of X-ray technique, this improvement, together with critical observations in interpretation, should make diagnosis possible even earlier in the onset of the disease. X-ray interpretation should always be made from negatives, as prints lose much in detail, which in the case of navicular disease is often of a very delicate nature. Shadows which may be obvious on a film, are often unrecognisable on a print.

Much information may be lost by the examination of films with unsuitable illumination, and an essential part of the radiologist's equipment is a viewing screen made from the best ground glass obtainable and illuminated behind with diffused light emanating from powerful daylight lamps.

It is advisable to have a screen on which two films can be examined simultaneously, as, in navicular radiology, it is often a great advantage to compare the films of both feet in this way.

The radiography of navicular disease is purely an aid to its clinical diagnosis, and nothing can be more detrimental to it than to assume that it supplants the clinical study of the disease. A judicious combination of clinical observations and X-ray appearances will often lead to a diagnosis otherwise unobtainable. The application of a sound clinical knowledge is essential for the successful radiologist.

It cannot be too strongly emphasised that radiography has its limitations. This can be readily understood when it is realised that certain chemical changes must take place in the tissues, making them more ray-transparent or ray-opaque, before any evidence is apparent on an X-ray film. In a negative diagnosis the possibility always exists of the presence of disease which has not advanced sufficiently to involve changes which will make it radiographically evident.

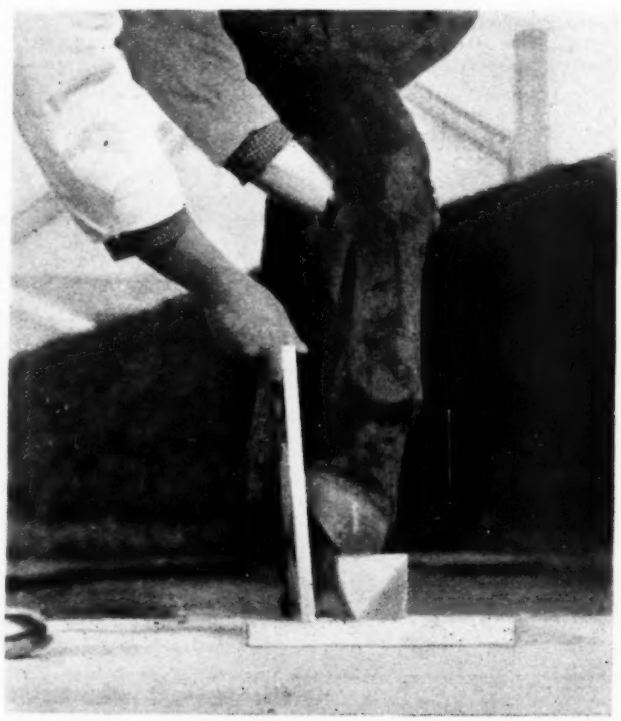
Appendix to Part I

The Upright Pedal Route of Radiographing the Foot

For this method the foot must rest with the anterior surface of the wall approximately perpendicular, in which case the sole assumes an angle of about 45 degrees to the ground. In this position the cassette can be placed behind the heels, parallel to the posterior surface of the navicular bone. A chalk mark made on the outer side of the wall, indicating the estimated angle of the navicular bone, is a useful guide to an assistant when placing the cassette in position. The X-ray beam must be directed towards the front of the pastern so that its centre will pass through the corono-pedal joint and strike the grid and cassette at a right-angle. The "Upright Pedal Route" photograph in Part 1 illustrates these points.

For practical purposes a stand is necessary which will support the foot in the required position without obstruction to the passage of the rays through the digit and on to the grid and film placed behind. A stand specially devised for this purpose is now being used successfully. The stand is made of wood and comprises a base-board 12 inches square and 1 inch thick, on which are mounted two blocks 3 inches square, the inner half of each block being cut so that a ledge is formed which slopes towards the front of the base-board at an angle of 45 degrees. The ledges support the outer and inner edges of the soles. The lowest part of each ledge is connected by means of a cross-member, 2 inches high and one inch thick, firmly fixed perpendicularly. This arrangement forms a recess for the reception of the toe of the hoof.

In order to obtain a complete image of the digital bones on the film it is essential that no more than half an inch of the sole occupies each ledge, consequently the distance required between the ledges varies with the size of the feet being radiographed. A stand with adjustable ledges is somewhat complicated and is more likely to lack stability than one in which the ledges are fixed. It is more satisfactory to make a set of four stands, with distances between the ledges ranging from 3½ to 5 inches, from which a size can be selected to meet all ordinary requirements.



Horse with the Foot on a Stand

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PART II—PATHOLOGY

The radiological interpretation in cases of navicular disease involves some understanding of the morbid changes which are taking place, in order to assess the significance of the various X-ray appearances.

It is this association which has provided the opportunity of examining the *post-mortem* appearance of the series of 128 feet from horses suffering from navicular disease on which these observations are based.

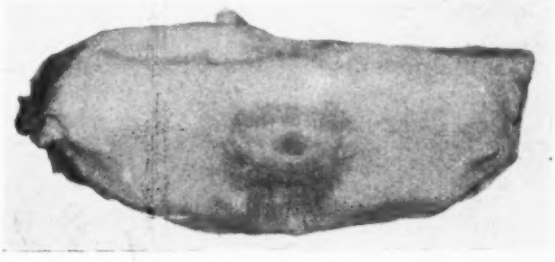
The complete pathological picture can only be seen when the bone, with its adjacent ligaments, tendon and bursa, is examined in the fresh and unboiled state.

The orthodox methods of removing these structures were found, when the procedure became a very frequent one, to be either unsatisfactory or too laborious and time-absorbing. Consequently, the following technique was evolved with such success that it may merit description. The hoof is not removed, but the skin is dissected off to the coronet. The heels are then separated by sawing through the lateral cartilages and the wings of the pedal bone, the saw passing immediately behind and parallel to the perforans tendon. The fibrous attachment between the extremities of the navicular bone and the fibro-fatty frog are cut, and then the os coronæ is disarticulated from the corono-pedal joint by passing the scalpel round the coronary region; when, by a little forward and backward traction, the remaining attachments can be severed, leaving the articular surfaces of the navicular and pedal bones exposed. Slight leverage between these surfaces allows a scalpel to pass between them when the inferior navicular ligament and the perforans tendon are cut, and very little dissection is then necessary to free the navicular bone, its bursa and the plantar aponeurosis, intact.

In the very considerable number of feet which have been critically examined in this way, and also histologically, from sections of the bones after decalcification with acid, all the various lesions of navicular disease described in the literature have been met with. The structures involved include the navicular bone, the fibro-cartilaginous covering of its tendon surface, the aponeurosis of the perforans tendon in apposition to it, and the intervening navicular bursa.

The pathological appearance of these structures varies enormously according to the progress of the disease, and an attempt has been made to identify the various stages with a view to tracing, if possible, its pathological origin.

The earliest naked-eye lesions seen in these observations have been minute erosions on the fibro-cartilage, which is but partially absorbed. These erosions are practically always situated in the vicinity of the navicular ridge and are usually encircled by a zone of hyperæmia, causing some discoloration which unfortunately becomes somewhat exaggerated photographically.



An Early Erosion on the Fibro-Cartilage

Although this lesion is so early as to be barely perceptible and is possibly frequently unnoticed, a section through the bone, examined histologically, will show that rarefaction of the compact layer adjacent to it is well evident and sometimes considerably advanced. In many such cases no departure from normal could be observed in the tendon surface opposite the erosion, whilst others were just showing evidence of the slightest roughening of a few fibres.

Frequently at this stage pin-point elevations can be felt by passing the finger over the fibro-cartilage in the vicinity of the erosion. These elevations are due to minute deposits of calcium

Micro-photographs

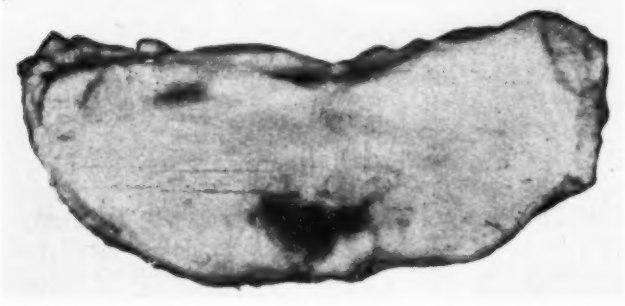
1. Normal Compacta. 2. and 3. Rarefied Compacta

salts on the bone surface, and become much more apparent when the specimen has dried. They doubtless increase in size a little, but only up to a point, and there is reason to believe that many are reabsorbed, possibly, for utilisation of their minerals elsewhere when attempts at recalcification begin within the bone.

According to Smith,[6] calcium deposits rarely exist when there is extensive caries of the bone. Such cases are, however, advanced, and it is most probable that the deposits were present in the earlier stages, before absorption commenced, but have subsequently disappeared. The compact bone supporting the fibro-cartilage is, at this early stage, very hyperæmic, giving to the glistening surface a purple tinge instead of the normal white.

Cases examined in a later stage show, instead of a small erosion, an ulcer in the fibro-cartilage, which has penetrated to the bone surface and has much discoloration around it.

In cases where no cavity has yet occurred in the compact bone at the base of the ulcer, it is always osteoporotic, having the appearance of fine pumice stone to the naked eye, whilst histologically the compacta in some



Ulceration of the Fibro-Cartilage, down to the Bone Surface, but no Cavity Formation

places has completely lost its identity, being replaced by numerous spaces bounded by trabeculæ, with here and there the remnants of a Haversian system.

Macerated Bone showing Porous Condition, at the base of the Ulcer which existed in the Fibro-Cartilage

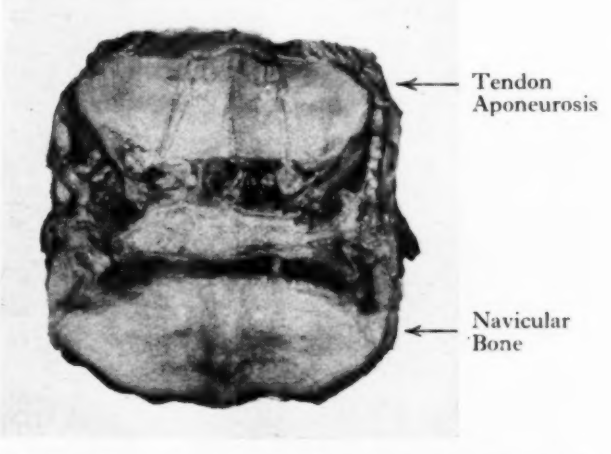
That the rarefaction of diseased navicular bones was observed by Smith[6] is shown by a quotation from his publication as follows:—

> "I am convinced that this highly rarefied condition of the navicular bone predisposes it to navicular disease, when on section we find difficulty in determining where the compact commences and the cancellated bone ends, such bone is naturally weaker than one possessing a strong cortical covering and is hence predisposed to disease."

It is the writer's contention, based on frequent observation of this picture in sections from navicular bones in feet whose partners were definitely affected, that this condition of rarefaction is actually navicular disease in its earliest form.

Turning to the tendon surface at this stage we find the damage has apparently progressed to an even greater extent, for large bundles of fibres are now torn away. They are in all cases torn in an upward direction from a point opposite the lower border of the navicular bone to the insertion of the superior navicular ligament into the perforans tendon above.

The fibres are loose and curled upwards, leaving a roughened and dull surface which is always stained a yellowish-brown colour, probably from pigments derived from extravasated blood. A point of great interest is that in the large number of cases examined pathologically by the writer not a single instance has been observed where the early tendon lesions were not exactly opposite and in contact with the erosion or ulcer on the fibro-cartilage and in the direct plane of movement of the navicular bone on the tendon. In advanced cases lesions exist in other parts of the aponeurosis as well, but this will be discussed later.



Tendon Fibres in the Plantar Aponeurosis, Torn to a Slight Degree Only

This appears definitely to establish a cause-and-effect association between these two lesions: one must be responsible for the origin of the other by causing friction. Opinions have always been divided as to whether navicular

disease originates in the bone or tendon. Dick (quoted by Smith[6]) considered that the original lesion was in the tendon, whilst Smith thought it was in the bone and other lesions were secondary. When it is considered that in every case of navicular disease which is advanced enough to cause clinical symptoms, the tendon has become involved to a considerable degree, it is not surprising that such a controversy existed.

The advent of radiological diagnosis which enables us to recognise early decalcification in the navicular bone, has made it possible to study the disease pathologically in a stage when the tendon is still not involved. Several such cases, usually from the foot opposite to the one in which disease is diagnosed clinically, have been found to have no tendon lesions and a normal fibro-cartilage, while histological examination of the bone shows varying degrees of rarefaction of the compacta. Cases of this nature have also been observed in which the fibro-cartilage shows evidence of very slight erosion with normal tendon, and others with early erosion and just recognisable tearing of a few tendon fibres. In no case has the tendon alone been involved.

These observations have left little doubt in the writer's mind that the disease originates in the bone, and other lesions follow, most probably from friction.

It must be admitted that in moderately advanced cases the tendon damage has overtaken that on the cartilage. This, however, is not unique, for in other situations it is seen that the result of friction between a comparatively soft tissue and a harder object, under great pressure, is an injury apparently out of all proportion.

In the next stage of the disease the rarefied bone at the base of the ulcer in the fibro-cartilage has collapsed, leaving a cavity which extends more or less deeply into the cancellated bone. The size of these cavities varies up to that of a pea, and it is interesting to note that there appears to be no tendency for them to increase in size when once established.

Cases with histories of long-standing disease have occasionally had very small cavities, whilst more recent cases have shown extensive cavity formation. An opportunity was afforded to the writer of examining a cavity radiologically over a period of two years, during which time there was no noticeable alteration in size.

It seems probable that the size of the cavity depends upon the extent of the rarefied area of bone, which collapses in its entirety when it is weakened by decalcification and absorption to a point when it can withstand the tendon pressure no longer.

These cavities, or so-called carious areas, are found only on the fibro-cartilaginous surface of the bone and in nearly all cases on the navicular ridge or on one or both sides of it. In only one case in this series has the writer seen a cavity elsewhere. Occasionally two cavities may coalesce.

The observations of pre-cavity cases which have been made leave no doubt that the navicular ridge is the site where the greatest rarefaction, and consequently cavity formation, occurs. The reason for this feature is uncertain, but it is suggested that the normal vascular arrangement of the navicular bone in this region, possibly combined with the greater tendon pressure applied on the sides of the ridge, is responsible for it.

Macerated Navicular Bones showing the Common Types of Cavity Formation

The intimate association of these local areas of advanced rarefaction of the compacta, which become cavities, with the ulceration of the fibro-cartilage, necessitates at this point a further reference to the latter.

The fibro-cartilage normally receives its blood supply from the compact layer of bone, and any interference with this would result in necrosis of the cartilage. With the area of rarefaction so frequently seen in the centre of the tendon surface of the navicular bone, the nutrition of the cartilage is partially lost and is completely so when the cavity forms, the result being ulceration of the cartilage.

Although circumscribed cavity formation in the centre of the bone is so common as to be expected in each case, one isolated instance was met with in which the disease of the bone was manifested quite unusually. The compact layer of bone over the whole tendon surface was completely rarefied, with the notable exception of the navicular ridge, which was only partly involved and was obviously still capable of giving considerable supporting strength to the tendon. It is interesting to note that no cavity formation had occurred in any part of the surface. Bony deposits on the extremities had given rise to large exostoses, which were not rarefied. The fibro-cartilage covering this surface was almost completely absorbed and the tendon surface in apposition a mass of torn fibres. In this case the bone was diseased to an advanced degree, but had resisted cavity formation. The opposite foot, although not involved to the same extent, had a similar pathology.

The reason for this rare departure from the usual course of the disease is not definite, but it is the writer's belief that it was due to an unusual type of vascularity occurring identically in both navicular bones of this individual, which resulted in less hyperæmia in the navicular ridge and consequently slower decalcification there.

The centre of each navicular bone was therefore capable of withstanding the great tendon pressure exerted at this point, whilst decalcification progressed in the remainder of the surface.

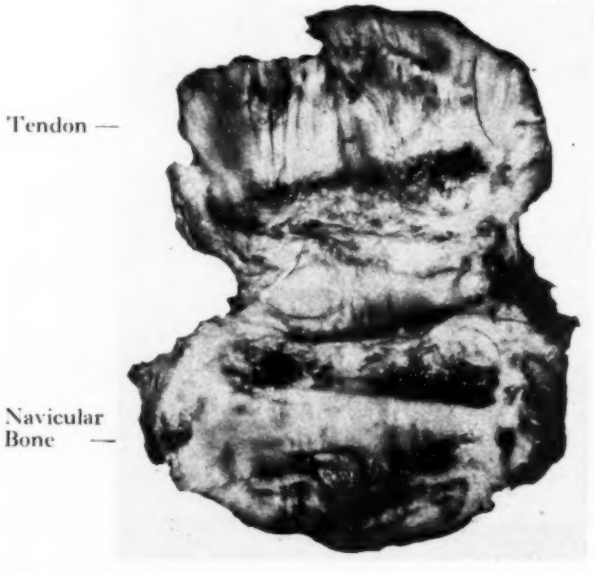
Navicular Bone, with Complete Rarefaction over the Whole Surface, but no Cavity Formation

In cases of navicular disease up to a moderate degree, the tendon surface of the bone and the tendon itself appear to be adequately lubricated with synovia, but in advanced cases, where adhesion of the tendon fibres to the bone cavities has taken place, the surfaces are noticeably dry and lubrication is usually non-existent. This is probably due to the bursal membrane having become functionless from fibrosis.

This dry condition of the surfaces introduces a new source of friction in the later stages of the disease, the effects of which are very obvious in advanced cases.

The fibro-cartilage on either side of the navicular ridge is exceedingly thin, appears to be worn away, and is dull and dark coloured. It is significant, however, that it is rarely ulcerated in this situation, as in the case of the primary lesions on the ridge previously described. This is doubtless due to the fact that its supporting compacta has not been rarefied sufficiently to interfere materially with its nutrition.

In such advanced cases the plantar aponeurosis in contact with the navicular bone is completely eroded and stained a deep brown. It always appears to have been more extensively damaged than the fibro-cartilage, owing to its softer consistency.



Advanced Navicular Disease, with Tendon Fibres Adhering to the Bone Cavity. Fibro-Cartilage Eroded and Plantar Aponeurosis Extensively Damaged

In the majority of advanced cases, tendon fibres from the aponeurosis become adherent to the bone cavity, and quite frequently a very firm union has been accomplished. The effect of this is to restrict movement between the adjacent structures and so to reduce friction

and trauma, which are doubtless responsible for the persistence of disease in the tissues involved.

If this process were allowed to continue, it is possible that the symptoms of navicular disease would be subdued, but the time involved and the fact that the result would be of very doubtful value make this course impracticable. It is, however, the probable explanation of reported recoveries from navicular disease. Smith[6] reported one case which became sound, but unfortunately had no record of the *post-mortem* appearance, which would have been valuable.

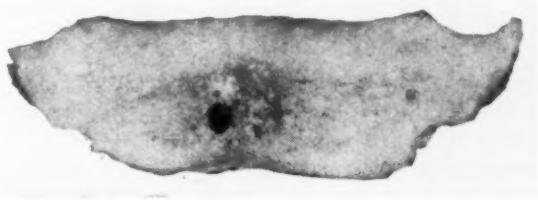
Navicular Bone (Unboiled) showing Strands of Tendon Firmly Adhering to the Cavities

A great proportion of the diseased navicular bones examined have presented some abnormality in outline, owing to the deposit of bony material on the borders and extremities. In no case was hypertrophy observed nor any increase in depth between the surfaces.

Osteophytes on the Upper Border

The histological examination of the exostoses from the upper and lower borders of the bone, and also the "spurs" on the extremities, has shown them to be composed of fibrous bone, with no evidence of the formation of true Haversian systems. These outgrowths probably result from the production of fibrous tissue caused by the stimulation of ligamentous strain on a bone already weakened by decalcification. This fibrous tissue in the usual course of events becomes calcified and then ossified.

The bony outgrowths always follow the direction of the ligaments attached at that point: this is particularly noticeable in the case of those on the extremities.



"Spur" Formation

In all cases examined by the writer an association between "spur" formation and other exostoses, and navicular disease, has been established. In most cases it was made obvious by the presence of cavities in the tendon surface of the bone and erosions on the fibro-cartilage or plantar aponeurosis, but in the few cases where such lesions were not apparent, histological examination of the navicular bone has shown evidence of rarefaction of the compacta. These observations strengthen the justification for diagnosing navicular disease radiologically when "spurs" or other outgrowths exist—which was the case in approximately 10 per cent. of the navicular bones in this series.

It has been quite a common feature in cases of definite navicular disease in one foot to find the other involved in degrees ranging from simple rarefaction of the compacta to cavity formation. It is in these feet, in which disease has not been clinically recognised, that the early stages of the condition have been studied both radiologically and pathologically.

In every instance observed where both feet were diseased, it has been found that one was considerably more advanced than the other. The writer has never seen a pair of feet which gave the impression from pathological appearances of having been simultaneously affected, and from this concludes that it is most likely that the disease in one foot is secondary.

The classically recognised symptom of "pointing," in which a horse with navicular disease places most of his weight on the sound foot whilst resting, and to an even greater extent if made to work, suggests the possibility of persistent trauma which is followed by hyperæmia, resulting in decalcification and the subsequent alterations previously described.

This view is supported by a number of cases reported by Smith[6] in which horses indisposed for long periods with injuries necessitating undue weight being borne on another limb, developed navicular disease in that limb.

The majority of cases of navicular disease examined have shown no evidence of deformity of the hoof, and those which have had this characteristic have proved to be very advanced and obviously long-standing cases. It is difficult

to imagine any reason for this deformity other than atrophy caused by a lengthy period of partial inaction.

The various factors suggested as responsible for the group of lesions found in navicular disease are all confronted with clinical and pathological contradictions which appear to make them untenable. Furthermore, the application of methods which reduce or remove such factors has had no influence on its incidence, as it still remains a disease of considerable economic importance, at least as far as Army horses are concerned.

Leriche and Polecard[8] have advanced theories on the growth and ossification of bone which have in this country been adopted and convincingly applied to bone pathology by Greig,[10] followed by others, including Watson Jones and Roberts.[11]

A discussion of these theories, beyond mention of the main principles, is not within the scope of this paper. It is contended that osteogenesis is controlled by the circulation and is independent of any specific action of osteoblasts, although they do function in bone production. Also that hyperæmia is followed by decalcification of bone, and ischæmia by calcification.

According to Greig[10] the following are facts to which there is no exception:—

(1) When the circulation of bone is maintained within certain limits, the bone remains unchanged.

(2) If hyperæmia is produced, the bone becomes rarefied, decalcified and osteoporotic.

(3) When the blood supply is restricted calcification occurs, giving increased density: osteosclerotic.

(4) When the blood supply is cut off the bone becomes necrosed.

If these basic principles can be accepted—and they appear to be supported by much clinical evidence—a practical explanation of the morbid changes observed in navicular disease becomes available.

That a condition of hyperæmia exists in the primary stages of navicular disease is without doubt, and, providing it is prolonged, it is followed by decalcification of the bone. Hyperæmia may be brought about by trauma, also by infection, an instance being recorded by Theiler[13] in which generalised hyperæmia followed by osteoporosis resulted from metritis. There may also be a relative hyperæmia in bone, following disuse as seen in an immobilised limb after fracture (Greig[10]).

The most probable cause of the original hyperæmia in navicular disease is trauma, though relative hyperæmia from disuse may play a subsidiary part later.

The anatomical situation of the navicular bone makes the possibility of direct trauma unlikely, but subcutaneous injuries from sprain or concussion in ligaments and other structures associated with it directly or indirectly, constitute a great proportion of the causes of equine fore-foot lameness.

Greig[10] has shown that subcutaneous lacerations in which signs of injury have gradually passed off give radiographic evidence, weeks or months later, of decalcification in the bones of the region. This he ascribes to a traumatic axon reflex, due to the liberation from injured tissues of histamine and acetylcholine, which act on the autonomic nerves, bringing about a prolonged localised dilatation of the arterioles and capillaries and hence hyperæmia with its inevitable decalcification. It is emphasised that an injury which is not unduly aggravated may give rise to hyperæmia of short duration, in which case the architecture of the bone may be little affected and soon restored. However, the usual anxiety of owners to return to work horses which have barely recovered from lameness, must be responsible for much repeated trauma and prolonged hyperæmia.

The writer's experience of the comparative frequency, after a few seasons, of navicular disease in polo ponies, lends support to this view. They are not only subjected to work which is particularly amenable to the class of injuries mentioned, but are so frequently played with disabilities which are calculated to give rise to persistent trauma in the region under discussion.

A study of the past history of the cases of navicular disease encountered has shown a preponderance of instances where admittances are recorded for lameness from sprains, etc., from which apparent recovery had occurred prior to the onset of navicular disease. These observations coincide with those of Smith[6] and are not without significance.

The effect of heredity on the incidence of navicular disease doubtless exists. It is, however, considered by the writer to be limited to the transmittance to progeny of a conformation or weakness in certain structures which renders them more susceptible to certain injuries when put to the exertions required by domestication.

It is with pleasure that I record my indebtedness to Major A. A. Pryer, D.S.O., R.A.V.C., for placing at my disposal the results of his earlier work on equine radiology; to Dr. Pullin, Director, Radiological Research Department, Woolwich; and Mr. L. G. H. Sarsfield, M.SC., of the same institution, for their great help in connection with many experiments on X-ray apparatus; to Sir Arnold Theiler, K.C.M.G., for his advice regarding the preparation of bone sections and the study of bone histology; and,

The Veterinary Record
November 30th, 1935.

THE RADIOLOGY OF NAVICULAR DISEASE

THE opinion has been frequently expressed, and accepted, that the field open to radiological diagnosis in veterinary practice is much more restricted than in human medicine and surgery. Whilst, to a considerable extent, this is of course true, the very fact that veterinary radiology has its own peculiar difficulties renders the task of recording any advance in our knowledge all the more gratifying.

On this occasion the advance to be noted concerns the employment of the X-rays in equine practice. From the earlier work carried out it appeared unlikely, as far as the horse was concerned, that the use of the X-rays could be extended beyond the detection of fractures and exostoses affecting the lower limbs. Examinations conducted with a view to determining the cause of lameness of other, and less-evident, origin afforded useful information in such a small number of cases that many practitioners decided that they were not worth the time and cost.

Many reasons can be advanced for the disappointing results that were obtained but the chief among them was doubtless the absence of opportunity for undertaking the mass of experimental work which must precede the birth of any new and accurate scientific development.

Success in veterinary radiology is not obtainable by merely purchasing one of the many excellent X-ray installations now on the market. He who employs the apparatus must possess a sound knowledge of X-ray physics, anatomy, pathology and, perhaps above all, long experience in the interpretation of X-ray films. Without these qualifications the results obtained are unlikely to enhance the reputation of the would-be radiologist.

An outstanding example of what may be achieved by skilled and painstaking investigation is afforded by the publication in this number of the paper by Major G. E. Oxspring of the staff of the Royal Army Veterinary School, Aldershot. A solution of that very difficult problem of X-raying satisfactorily the navicular region has been reached and it may be accepted that the presence of navicular disease, even in its early stages, can be accomplished by an experienced veterinary radiologist with no greater margin of error than that which attends the use of any other ancillary branch of diagnosis.

Whilst it seems likely that navicular disease is in many cases only one manifestation of a generalised osteo-arthritis the practitioner still has to deal with it as an independent clinical entity. The diagnosis of advanced cases of the disease seldom presents any difficulty to veterinary surgeons of experience. On the other hand diagnosis, by the usual methods, of the incipient case is often notoriously difficult and it is here that an X-ray examination may prove of the utmost value. The facilities for carrying out such examinations are greater in veterinary institutions than in the field. In the former subjects are usually available in larger numbers and the examinations can be carried out under standard conditions. In the latter numerous variable circumstances are liable to be encountered which may affect the accuracy of the results, but, at the same time, it should not be beyond the skill of the experienced radiologist to correct such factors as and when they arise.

above all, to Mr. J. D. Crisp, Chief Laboratory Assistant at the Royal Army Veterinary School, for his patient assistance throughout the work.

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Clinical Communication

THE CONTROL OF AVIAN TUBERCULOSIS BY MEANS OF THE TUBERCULIN TEST

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Avian tuberculosis is one of the most serious of the diseases affecting adult poultry and in certain districts it is the cause of very heavy losses to poultry-keepers.

The case reported upon is illustrative of the necessity of repeated tuberculin tests before the disease can be completely eradicated from a flock of poultry and is of interest because it tends to confirm the opinion that the avian tubercle bacillus may remain many weeks in the body of a fowl before the bird becomes sensitive to the tuberculin test.

The history of the origin of the outbreak was as follows: the owner lent a broody hen and gave a sitting of eggs to a smallholder, who had lost a number of birds, and stated that it was to be returned after the chickens were raised. Soon after the bird was returned to the owner it showed signs of ill-health, became lame, lost flesh and died. The owner, most unwisely, omitted to have a *post-mortem* examination carried out upon this bird. In a few weeks' time one or two of her birds died and others became lame and lost condition.

Five live birds were brought to the laboratory for examination; two were thin, one was lame, one exhibited drooping of the wings and the other seemed perfectly healthy. *Post-mortem* examination showed them all to be suffering from avian tuberculosis; the visceral lesions were not extensive, with the exception of the two thin birds, but the liver, spleen and intestines were all affected. Two eggs laid by these birds on the journey were found in the crate, one bird had a shelled egg in the oviduct and three birds had masses of well-developed ova in the process of development in their ovaries.

The avian tubercle bacillus has been found in eggs and although it is not generally considered to be of serious importance as a cause of disease in man, 20 deaths have been recorded from this cause[1] and with the very great increase in the poultry population during the past few years it is conceivable that occasionally avian tuberculosis may be contracted by human beings, particularly in cases of invalids who might be ordered raw eggs and milk. The fact of tuberculosis, caused by the avian tubercle bacillus, having been reported in man, makes the control of tuberculosis in fowls of some importance from the standpoint of human health.

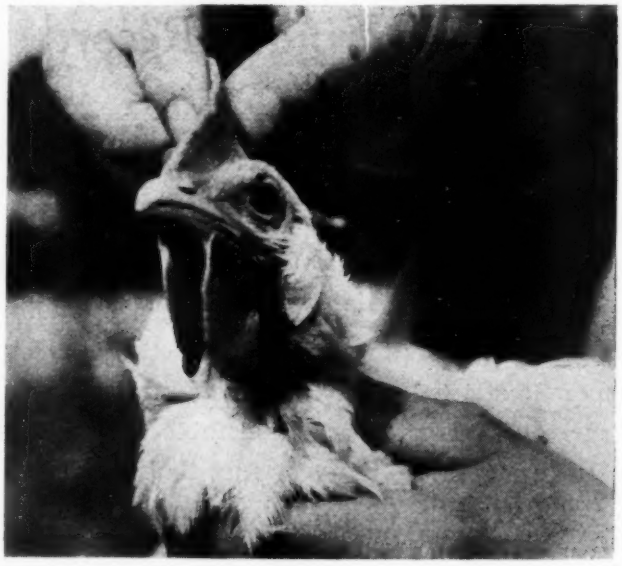

Fig. 1.—Shows a positive intradermal tuberculin reaction in the lower posterior portion of the wattles of a White Leghorn fowl. The swelling is small and of a doughy consistency. *Post-mortem* examination showed the bird to be infected with avian tuberculosis.

The owner was advised to have her birds tuberculin tested. This was carried out in the following manner: a dose of 0·1 c.c. of avian tuberculin, obtained from the Wellcome Laboratories, was injected into the skin of the wattle by means of a fine needle attached to a "record" syringe. Care was taken to avoid the needle point going too deeply into the skin, which would result in the tuberculin being injected subcutaneously, or too superficially, which might cause the skin to rupture on account of the pressure. After 24 hours from the time the tuberculin was injected the birds were examined and again 24 hours later. The reactors were evident upon palpation of the wattles and 19 per cent. of birds showed swellings of a doughy consistency varying greatly in size, many of the swellings being very small and only evident after close observation and palpation. When these birds were killed all showed typical lesions of tuberculosis and upon microscopical examination they proved to be infected with avian tuberculosis.

The non-reactors were then removed to an arable field over a mile away from where they had been before and it was arranged that they should be attended by a cottager who had no contact with the farm and who did not keep fowls herself.

Two months later the tuberculin test was again applied in a similar manner and 5 per cent. of the birds reacted. These were killed and examined in the laboratory; all were found to be suffering from avian tuberculosis in its early stages,

Fig. 2.—Shows a positive tuberculin reaction in the wattles of a White Leghorn fowl. The left wattle is seen to be considerably enlarged when compared with the normal left wattle. *Post-mortem* examination showed the bird to be infected with avian tuberculosis.

Fig. 3.—Shows the type and distribution of lesions of avian tuberculosis in the liver and spleen of three fowls which had suffered from this disease.

The non-reactors were again removed to fresh ground, this time half-a-mile away from where they had been before—they were looked after by another attendant. After two months the tuberculin test was again applied, with the result that one reactor was found. The *post-mortem* examination of this bird revealed early lesions of tuberculosis.

The fourth tuberculin test was applied to these birds two months later and all birds passed the test. No signs of the disease have been evident for several months since the final test and it appears that the outbreak has been successfully controlled.

Conclusion

The tuberculin test is a satisfactory means of controlling avian tuberculosis when repeatedly applied until no reactors are found and when fresh ground is available after removal of reacting birds.

Reference:—

T. C. Hull: "Diseases Transmitted from Animals to Man," 1930. 22.

COUNTY EGG LAYING TRIALS

The number of county egg laying trials has steadily increased to 39 over the whole of England and Wales with a total entry of 9,408 birds. The trials are officially conducted under county auspices and under uniform regulations approved by the Ministry of Agriculture. Their main object is to demonstrate, from the point of view of egg yield, egg size, seasonality of yield and constitutional vigour, the value of selected birds as breeding stock for egg production. The trials have also considerable educational value. For example, the results have shown that, since 1930-31 when the death-rate from casual causes was about 7 per cent. of a total entry of 6,450 birds, it steadily increased until in 1934-35 it was 16 per cent. of a total entry of 9,408 birds. With regard to the breeds entered in 1934-35, Rhode Island Reds were represented by 4,090 birds (43 per cent. of the total), White Wyandottes by 2,354 birds, White Leghorns by 1,576 birds and Light Sussex by 755 birds. The following table gives figures of average production (including production by birds which died) and average mortality of the three principal breeds at the 1934-35 trials:—

	Average egg yield per bird entered.	*Per cent. Mortality.*
Rhode Island Reds...	175·8	15·0
White Wyandottes...	178·8	16·9
White Leghorns ...	170·3	20·4

The Gold Challenge Cup for 1934-35, presented by the Millers' Mutual Association for award to the county whose laying trials show the lowest mortality among the counties entering the competition, provided the average egg production per bird entered did not fall below 170, was won by Devonshire with a mortality of 9·17 per cent. The average production of eggs per bird entered in the Devonshire trials was 191·40. The runners-up were West Wales (the combined trials of Carmarthen and Pembroke) with a mortality percentage of 10·00 and an average egg production of 179·31 per bird, and Northamptonshire with mortality at 10·42 per cent. and egg production at 202·21 per bird.

Abstracts

[**The Isolation of the Organism of Avian Tuberculosis from Cattle.** Feldman, W. H., and Schlotthauer, C. F. (1935.) *J. Amer. Vet. Med. Ass.* **86.** 5. pp. 635-643.]

From a herd of dairy cattle which had been tuberculin tested annually for a period of eleven years and in which there was cohabitation with tuberculous chickens, attempts were made by culture methods and the inoculation of laboratory animals to isolate the organism of tuberculosis from eleven of the animals that had reacted to tuberculin. In no instance was the bovine form of the tubercle bacillus obtained, although four strains of the organism of avian tuberculosis were isolated from three of the animals. From one animal, the organism was secured from a tuberculous lesion in the subcutis and from a mesenteric lymph node. From another animal the bacilli were obtained from a mesenteric lymph node only, and in the third cow the infective organism was isolated from an abscess in the subcutaneous tissue.

These data confirm the findings of other workers concerning the occurrence of the organism of avian tuberculosis in cattle and provide additional evidence that the avian form of the tubercle bacillus may not infrequently sensitise cattle to both mammalian and avian tuberculins.

S. J. E.

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[**The Distribution of Brucella abortus in the System of Carrier Cows.** Doyle, T. M. (1935.) *J. Comp. Path. & Therap.* **48.** 3. 192-217.]

Thirty-two cows naturally infected with *Br. abortus* were examined *post-mortem* in order to identify the predilection sites for localisation of infection in carrier cows. Cultural and biological examinations were made of the majority of tissues and glandular secretions. [An important omission in this examination was the mucosa and submucosa of the uterus. The author recognises this omission and considers that it should receive attention.] In no case was *Br. abortus* isolated from the kidney, ovary, bone marrow, mesenteric gland, urine, blood, thyroid gland, diaphragm or fæces. This organism was isolated from spleen, liver, various lymphatic glands, bile, udder and milk. The udder and supramammary glands constituted the most important sites of localisation, the iliac and pharyngeal glands being next in importance. Excretion of *Br. abortus* in the urine or fæces was not demonstrated, but since infection of the liver and bile was encountered it must be assumed that excretion of *Br. abortus* *via* the alimentary tract can take place.

E. J. P.

[**The Nation-wide Campaign to Control Bang's Disease.** Wight, A. E. *J. Amer. Vet. Med. Ass.* **87.** 3. 291-295.]

Funds were provided, for use by the Federal Government, to undertake the elimination of dairy and beef cattle found to be reactors to the test for Bang's disease. Federal regulations providing for the operation of the project became effective on July 19th, 1934, the work being delegated to the Bureau of Animal Industry, and a start was made within a very short time in co-operation with the livestock sanitary officials in the various States.

From available records of the results of agglutination blood tests for Bang's disease in various parts of the United States of America, it was believed that the disease existed to about 15 per cent. among the cattle in the dairy and breeding herds. The results of tests carried out since the beginning of the Federal project indicate that this estimate was a fairly correct average. The field work in the present campaign has been assigned to the stations already actively engaged in the eradication of bovine tuberculosis.

The Federal plan consists in the elimination, by slaughter, of cattle that react to the agglutination test for Bang's disease, to be followed by the necessary cleaning and disinfection of premises where the animals have been kept. A retest was considered desirable and when more funds became available it was decided to apply four separate tests on herds of cattle where infection was found, but not more than two negative tests were to be applied to any given herd.

During the year ended June 30th, 1935, the agglutination blood test was applied to about 210,000 herds containing approximately 3,300,000 cattle. A total of 381,000 reactors was removed from these herds. Infection was reported in 80,000 herds, while 130,000 herds contained no infection. These figures include a considerable number of retests.

Reports concerning the retesting of herds are encouraging in most States. When the infected herds are retested, about 60 to 65 per cent. of them are classed as free from the disease and the percentage of cattle infection has been reduced from about 15 per cent. to 4 per cent. Results of further retests are not yet available.

The compensation allowed for animals slaughtered under the scheme included a Federal payment, together with the salvage value of the animal, but in no case was the owner permitted to receive a total payment in excess of the market value. The testing of all cattle in two counties in Virginia has been started and reports indicate that infection is running about 5 per cent. The completion of testing in one county was accomplished on August 10th, 1935,

The total number of cattle tested was 8,923, comprising 1,995 herds, of which 250 herds were infected. Of the total cattle tested, 453 were positive to the test and 420 were suspicious. Blood testing was done in the laboratory and the field work was accomplished in ten weeks by seven field veterinarians and one supervisor.

A large temporary field staff has been recruited and while testing is mainly carried out in the laboratory, a few specially trained men perform tests in the field.

Data have been collected concerning those animals which do not give a positive reaction, but show some evidence of agglutination. Of 26,191 such cases retested, 5,371 were positive, 15,285 negative and 5,535 continued as suspects.

Vaccination of calves by the use of a vaccine prepared from strains of Brucella of low virulence is being carried out, though no results are yet available.

Publicity is being given to the scheme through the medium of the Press, wireless talks, special pamphlets and a mimeographed circular.

D. W. M.

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[**A Whole-blood Field Agglutination Test for Bang's Disease in Range Cattle.** Welch, H., and Marsh, H. (1935.) *J. Amer. Vet. Med. Ass.* **86.** 4. 493-507.]

An agglutination test for *Br. abortus* has been devised which enables results to be obtained very rapidly. Citrated whole blood is used in conjunction with antigen stained with methyl-violet for a rapid slide test which can be read within five minutes of being set up. The virtue of this test is that it can be applied to ranching conditions. Animals are driven into a long narrow "crush" holding eight to ten bovines in single file. Blood samples are collected by bleeding from a knife incision made in the tail of each animal, the blood being collected in tubes holding citrate solution. A drop of blood is mixed with a drop of antigen on a slide which is placed on a special reading box. This holds warm water which somewhat hastens the reaction. The reading box holds as many of these slides as there are animals in the "crush." In this way a "crushful" of unbranded cattle can be tested in a few minutes and the reactors and non-reactors separated as they are driven out. A very close correlation was found between the results obtained by this rapid test and those obtained by the ordinary tube technique.

E. J. P.

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[**Bang's Disease in Bison and Elk in the Yellowstone National Park and in the National Bison Ranges.** Tunnicliff, E. A., and Marsh, H. (1935.) *J. Amer. Vet. Med. Ass.* **86.** 6. 745-752.]

The presence of contagious abortion amongst herds of buffalo in the Yellowstone Park was recorded in 1917. Infection was very active, since 70 per cent. of young cows and 41 per cent. out of 60 steers reacted to the agglutination test. *Br. abortus* was isolated from the testicles of two bulls. Elk which were in occasional contact with the bison apparently picked up infection, since out of 105 samples of elk serum 8 per cent. gave positive reactions.

E. J. P.

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[**Bang's Disease Infection Transmitted by Horses.** White, G. C., and Swett, P. P. (1935.) *J. Amer. Vet. Med. Ass.* **87.** 2. 146-150.]

Following a useful survey of the literature concerning the incidence of Brucella infection in horses, the authors describe a herd of cows from which all contagious abortion reactors had been eliminated and which remained free from reactors for three years. At the end of this period six cows suddenly commenced to react and later five more cows became infected, although no fresh stock had been introduced, and though there appeared to be no possibility of contact with any source of infection. Subsequently it transpired that one of the horses living in an adjacent barn reacted strongly to the abortion test. Complete segregation of horses from cows on this farm put a stop to this outbreak of contagious abortion.

E. J. P.

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[**A Method for Preserving Brucella abortus for Use in the Preparation of Agglutination Antigen.** Donham, C. R., and Fitch, C. P. *J. Amer. Vet. Med. Ass.* **87.** 2. 188-190.]

The method described entails washing the bacteria off solid media in the usual manner. Filtration and sterilisation of the suspension is followed by centrifugalisation, after which a suitable suspension of the deposit is poured into Petri dishes and dried in a thin film.

It is claimed that the dry bacterial mass will retain its antigenic properties for an indefinite length of time, being resuspended when required, whereas the usual plate method antigen preparations only retain their sensitivity for about six months.

D. W. M.

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[**Avitaminosis-A in Swine.** Elder, C. (1935.) *J. Amer. Vet. Med. Ass.* **87.** 1. 22-30.]

This paper describes an unusual disease in swine. The most outstanding symptom was an inco-ordination affecting chiefly the hind legs, but in some cases the fore limbs were also affected. There was a peculiar jerking movement, the animals walking with a "stringhalt" action, raising the hind feet high and bringing them well forward. In the more severe cases there were spasms of the legs and the animals

had difficulty in walking. All the animals were conscious but highly nervous. No rise in temperature occurred and appetite remained good. When, however, the symptoms became very severe the animals were unable to get to their feet and exhibited symptoms of the so-called posterior paralysis. On *post-mortem* examination no gross lesions were found in any part of the carcase. Sections of spinal cord and sciatic nerve, imbedded by the Marchi technique, showed unmistakable evidence of fatty degeneration or myelin degeneration. Normal pigs killed at the same time, from the same group of hogs, showed no nerve degeneration changes. This disease was diagnosed as vitamin A deficiency, though it could not be proved that the diet was vitamin A deficient since the swine were receiving corn, mostly yellow, a mineral mixture of equal parts of precipitated calcium phosphate, bone meal and salt, all self-fed, and a supplementary mixture of tankage 3 parts, linseed oil meal 1 part and alfalfa meal 1 part. Some of the animals received, in addition, dried skim milk, liver or fish meal or combinations of these substances. This ration had been fed over a period of three years and it was only in the third year that the above symptoms developed and when fed in the fourth year no disease of any kind was observed. Addition of vitamin A to the ration corrected the symptoms observed. The best and quickest results were obtained when the animals were allowed to run on a good blue grass pasture. Indeed, some animals given cod-liver oil and alfalfa hay did not make complete recovery although the cod-liver oil was known to contain a high vitamin A content. The vitamin A content of the livers of affected pigs was not estimated. It is doubtful if we can accept the diagnosis of vitamin A deficiency from the proof offered, despite the correlation obtained between the symptoms of the disease observed in the field and that observed in experimentally-produced vitamin A deficiency, and the possibility of some other factor than vitamin A being responsible should be kept in mind. J. S.

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[Will Botulism become a World-wide Hazard to Wild-fowl? Kalmbach, E. R. (1935.) *J. Amer. Vet. Med. Ass.* **87.** 2. 185-187.]

Records have been collected of a number of serious outbreaks of botulism amongst wild-fowl which have arisen spontaneously and apparently not due to human agency. Such outbreaks, resulting in serious mortality, have occurred in numerous parts of North America as well as in South America and Australia. The causal organism is *Clostridium botulinum*, probably type C. It is thought that toxin is produced by these organisms growing in accumulations of vegetation in stagnant water.

E. J. P.

Review

[Pathologisch-anatomische Diagnostik an Tierleichen. Veterinary *Post-mortem* Diagnosis. By Dr. L. Lund, Professor of Pathology at Hannover Veterinary College. 2nd edition. Published by M. & H. Schaper, Hannover. (1935.) Price RM 22.]

The first edition of this book appeared in 1929 and was intended as a concise instructional text-book in morbid anatomy for veterinary students. While not so lengthy as the exhaustive multi-volume work of Joest, it yet contained enough detail of the more common pathological changes to give the student a good grounding in this important subject. This second edition has been thoroughly revised and further enriched by an additional 23 figures, making 131 in all.

After a short general introduction the subject matter is given in straightforward (anatomical) order, each section on the various organs being introduced by a note on their normal weight in the domestic animals; then the malformations and diseases are described. Infectious, parasitic, organic and neoplastic conditions are included. The last section of the book deals with the special procedures for autopsy formulated in connection with the diagnosis of the notifiable diseases of domestic animals in Germany.

Actually, this book is complementary to two others, the first Professor Krause's 1933 text-book on *Post-mortem* Technique (reviewed in the *V.R.*, No. 46 of 1933)—Lund himself referring to this point—and the second a recent (1931) text-book on Histological Pathology, also by Professor Lund. A study of these books cannot fail to lay the foundations of a sure knowledge for the veterinary pathologist, with more particular reference to the clinician accustomed to following his cases, or to put it more happily, those of his cases which are beyond human aid, to the *post-mortem* room. A few omissions of diseases which are not so uncommon, such as so-called azoturia and Stuttgart disease, have been noted, but it is clear that the author has had to select the available material for inclusion.

All the figures are good and successful in their object and the paper and printing are excellent. An extensive index is provided.

The report of the Gloucestershire Diseases of Animals Committee states that the number of dairy cattle inspected during the half-year ending September 30th was 48,821, and the number of confirmed cases of the diseases specified in the Tuberculosis or Milk and Dairies Orders was 336. During the same half-year the number of cattle reported by veterinary inspectors to be suffering from Johne's disease was 26.

TWELFTH INTERNATIONAL VETERINARY CONGRESS

Resolutions Passed by the Congress

We give below the text of the recently-published resolutions passed by the Twelfth International Veterinary Congress held at New York, August 13th to 18th, 1934.

. . . . .

At the closing meeting of the Congress, held on Saturday, August 18th, 1934, the following resolutions were passed:—

I. Amending Paragraph 25 of the Bye-laws of the International Veterinary Congress

(*a*) That besides the three languages officially adopted for the International Veterinary Congresses up to the present time, other languages will be considered equally as official for future Congresses, under the condition specified, that each of them have at least 200 subscriptions.

(*b*) That in order for this arrangement to be practical, it is indispensable that the subscriptions be made at least six months before the opening of a Congress. The subscriptions must name the language in which the subscribers desire that their communications be made. Eventually the expense for additional interpreters in the language specified will be borne by the country (or countries) which demand that the language (or languages) be accepted officially.

II. Tuberculosis

(*a*) That the principles laid down in the resolution adopted by the Congress at The Hague, concerning the combating of bovine tuberculosis,[1] have proved to be successful and that they be continued further, and

(*b*) That after "forms of tuberculosis" in paragraph 3, there should be added: "Also for cases of tuberculosis in calves and pigs revealed by meat inspection," and that the following addition be made to paragraph 6: "This especially concerns the efforts made toward the eradication of tuberculosis in herds only slightly infected; also the selection and maintenance of herds from tuberculosis," and

(*c*) That researches on immunisation against tuberculosis should be supported by the Governments of the various countries.

III. Lymphadenitis of Sheep

(*a*) That the Twelfth International Veterinary Congress—realising that from the information available up to the present time on the subject of "lymphadenitis of sheep," there arise fundamental differences of opinion as to the significance of the anatomico-pathological lesions of this disease, which is the reason for the differences in the judgments which the different veterinary services apply in meat inspection—exhort interested countries to submit this problem for study by an international commission of experts.

IV. Diseases of Young Animals

(*a*) That the resolution of the Eleventh International Veterinary Congress in London,[2] asking

[1]Resolution XI of the Ninth International Veterinary Congress, held at The Hague, follows:—

(1) Effectually to prevent the further spread of bovine tuberculosis and to conquer the disease, gradually but certainly, governmental measures are wanted.

(2) The governmental measures must extend to all forms of this disease and in the first place to open tuberculosis of the lungs and to tuberculosis of the udder, secondly to tuberculosis of the uterus, the bowels and kidneys.

(3) For the forms of tuberculosis mentioned under (2) compulsory notifying report must be introduced.

(4) Animals suffering from open tuberculosis are to be killed immediately; the owners must be indemnified. The stables of these animals and their immediate surroundings must be disinfected.

(5) To prevent the spread of tuberculosis by the milk residues of the dairy farms, sufficient sterilisation of the skimmed milk, buttermilk, and whey, before they are used as food for animals, must be recommended and also the destruction of the centrifuge rests.

(6) Besides the governmental measures against open tuberculosis of cattle, extensive voluntary measures to repress tuberculosis protected by government ought to be recomended to the owners, and their general application encouraged with the help of the State.

(7) To secure a uniform execution of governmental measures against tuberculosis and to promote essential private measures, a central institute for the struggle against tuberculosis should be established in all countries.

(8) The obtaining of tuberculin for veterinary purposes is to be controlled by the State. In every case, tuberculin may only be given to medical men and veterinary surgeons.

(9) The next Congress should treat measures to be taken against breeding cattle reacting on tuberculin, from the point of view of international traffic.

(10) The Congress invites the Permanent Committee of the international veterinary congresses to study the opportunity of an international committee for combating the tuberculosis of cattle, and, if possible, to formulate a proposal for the next Congress.

[2]Resolution VIII of the Eleventh International Veterinary Congress, held in London, follows:—

That having regard to the good results of the organisation for combating diseases of the new born in Germany, the Congress recommends that in all countries similar organisations should be established, with a view to the formation of an International Union for that purpose, to which each country would furnish annual reports for circulation to all countries concerned.

for the creation in each country of an organisation, having a central seat, for the control of the diseases incident to the rearing of young animals, is hereby repeated.

V. Control of Parasites and Parasitic Diseases

(*a*) That the Congress adopt a recommendation of the Permanent Committee which proposes the appointment of a permanent international committee on the control of parasites and parasitic diseases, to include a representative of each particular country; that the committee should not confine its activities to meetings at long intervals, but that there should be a constant interchange of information on the subject between members of the committee, and that the representative of each country should be in a position to communicate new findings in this field to the workers concerned.

VI. Diseases of Poultry

(*a*) That in the future Congresses, the sessions on diseases of poultry should be combined, in order that the necessary attention may be given to these worthy problems which are continually increasing in importance.

VII. Genetics

(*a*) That instruction in genetics be extended in the schools and faculties of veterinary medicine.

(*b*) That scientific societies of veterinary medicine devote more time to the problems of applied genetics.

(*c*) That an international agreement be brought about among the zootechnic instructions of the different countries toward as close a collaboration as possible from the scientific standpoint.

(*d*) That the International Veterinary Congress continue to retain the problem of genetics on its programme.

VIII. Publication of Veterinary Knowledge and its More Adequate Distribution Throughout the World

(*a*) That the Twelfth International Veterinary Congress hereby embody in its deliberations a broad recognition of the importance of prompt announcement and wide distribution of significant results of sound research.

(*b*) That the nations provide adequate facilities, personnel, and funds for perfecting present methods of disseminating knowledge, thereby facilitating early and broad use of such knowledge, aiding research, and preventing duplication of effort.

(*c*) That action be taken by delegates of the Congress to acquaint proper officials of their Governments with the practical and economic benefits that will accrue to their countries through the provision of this resolution.

(*d*) That publications direct attention to international aspects of results and other studies and that nomenclature be of international clarity or of a nature to permit clear translation.

(*e*) That mailing lists and other details of distribution be so organised and frequently revised as to carry out fully the intent and provisions of this resolution.

IX. Veterinary Milk Control

(*a*) That wholesome milk can be obtained only from healthy cows. Milk from diseased cows can transmit diseases that may greatly endanger human health or may even prove fatal to man; that the prevention of these infections is one of the duties of the veterinarian, as it is a question of diagnosing animal diseases.

(*b*) That regulations relative to the cleanliness and keeping quality of milk, even with compulsory pasteurisation, cannot be substituted for veterinary milk control.

(*c*) That for these reasons, veterinary milk control is an absolute necessity in cases where there is official milk control.

X. Appreciation of the Bureau of Animal Industry

(*a*) That the Twelfth International Veterinary Congress, in approving the very interesting report of Dr. Mohler on the "Relationship of Veterinary Science to Animal Breeding and Public Health and the Legal Protection of the Practice of Veterinary Science," applaud Dr. Mohler and all the functionaries of the Bureau of Animal Industry, whose work is highly appreciated in all the countries and that it extend its homages and felicitations to the American Government, who founded this great institution.

CONTAGIOUS PAPILLOMATOSIS

The British Medical Journal of November 9th quotes L. Kumer (*Wien. klin. Woch.* July 5th, 1935) as stating that epidemic papillomatosis occurs in the horse, ox, dog and hare, the chief regions affected being the skin, mouth, udder and vagina. In most of these animals the infectivity of the tissue or the Berkefeld filtrate has been proved by injection into others of the same species. The probability of an ultravirus being responsible in human beings for warts, condylomata acuminata and laryngeal papilloma rests on the experiments of several workers. There is evidence of papillomatous infection of the cow's udder by a warty milker, and of the converse; but experimental efforts to transmit from one species to another have only occasionally been successful. Kumer alludes to an epidemic of papillomatosis of the mouth and jowl occurring in Alpine chamois; submucous injection of the tissue débris in a rabbit induced, after about ten days' incubation, oral papillomatosis or warts in the genitalia. Biberstein, in 1930, reported a curative action of a vaccine, prepared from ox papillomatosis; not only in oxen but also in human warts.

N.V.M.A. Divisional Reports

CENTRAL VETERINARY SOCIETY

SIXTY-SECOND ANNUAL DINNER

Tributes to Sterling Service

This year's annual dinner-dance of the Central Veterinary Society, which was held at the Mayfair Hotel, Berkeley Street, W., on November 7th, was felt by all who were privileged to attend it to be a particularly happy and successful event. Not only was there an attendance reminiscent of the great days when no one missed a "Central" dinner—or meeting, for that matter—if it were at all possible to be there, but it was so obviously regarded as an opportunity for paying well-merited tribute to two Fellows who have rendered the Society service of the essential, unassuming kind that makes a veterinary organisation either just another Division of the "National," or a virile body, membership of which is something to be valued. It was certainly felt by all present to be supremely fitting both that one who had carried on the arduous and "humdrum" duties of Hon. Secretary with conspicuous ability over a number of years should be seen in the seat of honour—Captain J. F. Macdonald has recently been elected President—and that Mr. H. D. Jones, by reason of a record second to none in point of enthusiasm and consistent attendance, should receive the "Victory" Medal.

"THE CENTRAL VETERINARY SOCIETY"

An additional source of pleasure to everyone was the circumstance that the proposer of the toast of "The Central Veterinary Society," Mr. J. W. McIntosh, is not only the President of the Royal College of Veterinary Surgeons for the year—being "translated" in that proud capacity from an old and honoured member of the "Central" to the guest of the evening—but has for many years been Captain Macdonald's "guide, philosopher and friend."

In submitting the toast (which followed that of H.M. the King) Mr. McIntosh, who was enthusiastically received, said that his first duty was to thank the President and Fellows of the Society for having him as a guest that evening and for the cordiality of their welcome and for their hospitality.

He confessed to some difficulty in recognising himself as a guest in that company, with which he had been so closely and so happily associated as one of themselves for over a quarter of a century. He realised, of course, that the honour had been extended to him in his capacity as President of the Royal College of Veterinary Surgeons, and not because of any special merit or claims of his own. They had done him the additional honour of asking him to submit the toast of the evening—"The Central Veterinary Society." It required few words from him to commend that toast in a gathering essentially composed of its members, but he was particularly glad of the opportunity to say a few words on that occasion, as they had presiding over them an old pupil of his own and a great family friend. Thirty years ago Mr. Macdonald, then a budding youth, was placed under his charge for a time, with a view to initiating him into the mysteries of the profession, and it was with pride that he claimed some responsibility for laying the foundation of that greater superstructure which he had so well and honourably maintained throughout his whole professional life. Mr. Macdonald was well endowed with his country's characteristics—qualities which he was told were the envy of all other countries—his chief being extreme modesty, no doubt strengthened and developed during his pupilage. (Laughter.)

His work for that Society as Hon. Secretary was well known to all of them, and by raising him to the chair they had signified in the highest possible manner their appreciation of those services and his many other excellent qualities. It was a very real pleasure to him (Mr. McIntosh) to see Mr. Macdonald's sterling worth so fittingly recognised by his fellow members. (Cheers.)

What could he say regarding the "Central" itself that was not already well known and felt by all of them? Twenty-seven years ago, when he came from that peaceful country beyond the Tweed to pursue his vocation in that great city, he received a very warm and homely welcome from that Society which resulted in many helpful associations and lasting friendships.

A society such as that, by the judicious blending of its scientific and social sides, was of very real value in giving unifying life to its members. It afforded them the opportunity of pooling their experiences and knowledge, not in any spirit of arrogance or conquest, but by working along the lines of mutual help and earnest endeavour towards a common prosperity.

Those ideals had been well exemplified in the work of the "Central" in the past year and they need have no fear for the future. (Loud cheers.)

The President (Captain J. F. Macdonald), who was warmly acclaimed on rising, said that inasmuch as it was his annual duty for many years, while serving as Secretary to that Society, to warn all speakers of the necessity for brevity, he proposed as far as possible to remain loyal to that policy that night. He had, however, to thank certain gentlemen on behalf

of the Fellows for their services, and he trusted that those gentlemen would forgive him if he was somewhat brief.

First of all he had to thank Mr. McIntosh for the very happy manner in which he had proposed the toast that evening. Might he also say how very proud they were to see him in his present position as head of the profession, a position which he had so justly earned and so richly deserved. (Cheers.) He would not suggest that his pupilage with Mr. McIntosh was in any way responsible for the prominent place Mr. McIntosh now took in the profession, but he felt that such an experience must have hardened and strengthened his character considerably. (Laughter.)

He must also thank Mr. McIntosh for the very charitable view he had taken of his own shortcomings. How much of that was due to the mellowing influence of excellent wine, he did not know, but he could reveal moments of stress in the past, when Mr. McIntosh had summed up his character in sentences terse, more pungent and probably more accurate than those he had used that night. (Laughter.) That rather left him wondering whether he (Mr. Macdonald) was the Dr. Jekyll of Mayfair or the Mr. Hyde of Bermondsey. Possibly the truth lay somewhere between those rather extreme views.

He had also to express to their past President, Mr. Leonard Balls, their appreciation of his efficient conduct of the Society's business during the past session. He would particularly congratulate Mr. Balls on combining efficiency with personal popularity. That he took to be the hall-mark of a good President. He had reason to be grateful himself to the past President, for he had conferred upon him (Mr. Macdonald) his only claim to fame, inasmuch as he stood before them the first President of that Society to wear two collars simultaneously during the annual dinner. It was entirely owing to Mr. Balls' generosity that they had that handsome collar and medallion for all future Presidents to wear. He had, however, negatived the somewhat bizarre suggestion from a gentleman at the top table that Presidents of Scottish extraction should wear the decoration as a sporran. (Laughter.) He felt that in that he had the full support of Council.

Next on the list of victims for mention in despatches came those two hardy annuals, the Hon. Treasurer and the Hon. Secretary. He was sure no one would quarrel with him if he described Dr. McCunn as a stout and sturdy pillar of the Society. His life was a constant struggle to collect the annual subscription from the reluctant Fellows. A persuasive manner nearly always produced satisfactory results, but Dr. McCunn was in the fortunate position that his physique enabled him to take further measures with the reluctant member should those be necessary. He himself always paid promptly. (Laughter.)

To Mr. Bywater, he, as Mr. Bywater's predecessor, would, in addition to their grateful thanks, extend his own personal sympathy in his arduous task. Only one who had performed those duties could properly appreciate the amount of work to be done. In Mr. Bywater they had a man who shirked nothing.

The arrangements for that night's dinner were an excellent example of his efficiency and he was not sure that the name of Mrs. Bywater ought not to be included in that respect. They were lucky in their choice of both their Treasurer and their Secretary, and he was certain that they all hoped they might retain their services for many years to come. (Hear, hear.)

Before sinking back into the welcome obscurity of the chair, he would like just to say one word about their guests. They had cut the toast list so ruthlessly in order to start dancing punctually that that was the only opportunity which was available to say how delighted they were to have so many guests with them that night. The old Army maxim which went "No names, no packdrill" still held good that day, and although there were many distinguished men and women there as guests, he proposed to avoid mention of them publicly and just to say to all the visitors how pleased they were to have them with them, that they hoped they were all enjoying the evening, and that they would be delighted to see them there again next year. (Cheers.)

PRESENTATION OF THE "VICTORY" MEDAL

"My next duty," proceeded the President, "is to present the 'Victory' Medal. The 'Victory' Medallist this year is Mr. H. D. Jones, and Mr. Jones is much too modest a man to listen without acute embarrassment to a detailed account of his many virtues, but I must ask Mr. Jones to bear with me as patiently as possible while I remind you of his sterling worth to the Society. Mr. Jones has been a member for 30 years; that in itself is not a very rare occurrence, but what does call for commendation is the fact that during those 30 years he has been an active member and a constant attender at all meetings. There are few of his colleagues who can claim such a record of consistent good work and loyalty to the Society over such a period." (Cheers.)

Mr. Jones' recent paper on the feeding of the commercial draught horse was practically a classic and would serve as a constant guide to all those who work lay in that connection. He recalled that a previous paper of the "Victory" Medallist's was not so successful. It was read

to a rapidly dwindling audience and he gathered that the essayist was considerably agitated until he realised that the lack of interest was due to an intensive air raid in the immediate vicinity. (Laughter.) Mr. Jones finished his paper, however. That, he thought, was typical of him. Any job he started on had to be finished. There was much more he could say in favour of Mr. Jones, but he observed that the unfortunate subject of his eulogy was showing signs of acute distress, so he would now turn to the debit side of his balance-sheet.

It might astonish them to hear that that was by no means clear. Mr. Jones had blotted his copy book quite badly in one respect and he was therefore unable to give him a clean certificate of soundness. He referred, of course, to his apparently irrevocable decision not to accept the Presidency of the Society which had been offered to him on so many occasions. The remedy lay with Mr. Jones and he (Mr. Macdonald) would, without further delay, call upon him to come forward and accept the medal, which had been so deservedly awarded to him. (Cheers.)

Mr. H. D. Jones, in acknowledgment, said that he should like to thank the Central Veterinary Society for awarding him that medal, and the President for the very kind way in which he had presented it to him. He was very pleased, on coming into that hall that evening, when one of the Fellows said to him, "Thank goodness your lack of speech will be appreciated to-night"—(laughter)—but he must say that the President's words had covered him with confusion and that, although that was a "Victory" Medal, his feelings were scarcely those of a conqueror: for that medal was usually regarded as a coveted prize for hard work and he must confess that his long association with that Society had been nothing but a pleasure for him and that he had been well repaid already for the little he had done for it. He had made many friends; he had many times received invaluable professional help, and he had heard many funny jokes he would never have heard anywhere else. (Laughter.)

As a member of the Council of the Society he desired to take that opportunity of paying his tribute to their Secretary and to their Treasurer. These officers had really done all the hard work and no praise could be too high, in his opinion, for these gentlemen. (Hear, hear.) It was for that reason that they were so pleased their former Secretary was the President of that Society. (Cheers.)

Mr. Jones said, in conclusion, that it was his sincere wish to give his services to that Society so long as they could be of any benefit to it.

Prior to the dinner the Fellows and guests and their ladies were received by the President and Mrs. Macdonald. During the excellent repast and for the dancing which followed the speeches, Jack Anderson and his Championship Cup Band again acquitted themselves admirably, while at intervals throughout the evening Mr. R. Hassett (entertainer) and Mr. Lionel King (conjurer), their forces augmented at a late hour by Giovanni (illusionist), produced much hilarity amongst the company.

H. E. Bywater, *Hon. Secretary.*

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NORTH OF ENGLAND V.M.A.*

MEETING AT NEWCASTLE-ON-TYNE

A meeting of the North of England Veterinary Medical Association was held in the Agricultural Department, Armstrong College, Newcastle-on-Tyne, on Saturday, September 28th, 1935, when there were present Messrs. J. R. Rider (in the chair), F. Pickering, T. R. Jarvie, W. Lyle Stewart, R. Barker, T. Wilkinson, J. W. Rider, C. Nicholson, F. Christopher, P. Snaith, C. G. Hill, J. H. Taylor, H. Birkett Allan, J. J. McDowall, C. M. G. Oliver, J. Smith, H. P. Lightfoot, G. Atkinson, H. S. Elphick and T. M. Mitchell.

The minutes, having been published, were taken as read.

Correspondence.—(1) Apologies for absence were received from Sir Frederick Hobday, Messrs. A. C. Forbes, E. R. Callender, R. Simpson, H. Bain and J. D. Peele.

(2) Mr. Simpson tendered his resignation as from January 1st next, a step which was forced upon him by the difficulty of attending N.V.M.A. and R.C.V.S. meetings. He hoped, however, that later, when stress of business was not so great, he might be able to attend the meetings again.

Election of New Members.—Messrs. I. A. Graham, of Berwick-on-Tweed; Thos. Johnson, of Durham County Council; and N. Macdonald, of Guisborough, were elected as new members.

Nominations.—Mr. Croudace, of Corbridge, who wished to return to the Association, was nominated for membership.

Report of Council.—A meeting of the Council was held at Durham on Tuesday, September 10th, and the minutes of the previous meeting had been taken as read.

The nomination of two representatives to the Provisional Committee of the N.V.M.A. in connection with the Congress to be held in Scarborough in 1936 was a question that had arisen, and Messrs. T. Wilkinson and C. G. Hill had been proposed; in the event of these gentlemen being unable to accept the position, Messrs. Allan and Christopher had expressed their willingness to accept nomination.

* Received for publication November 9th, 1935.

Further business had been the arranging for the present general meeting.

The Chairman sought the meeting's approval of the Council's action in forwarding the names of Messrs. Wilkinson and Hill as representatives to the N.V.M.A., and that was given.

Practical Demonstration for December Meeting.—Mr. J. W. Rider proposed that a demonstration be given on tuberculin testing, in view of Mr. Allan's scheme. It was agreed to leave the matter in the hands of the Council.

Formation of Tubercle-free Herds

The Chairman now mentioned that careful and prolonged consideration had been given to the scheme for the formation of tubercle-free herds. A draft of the scheme having been circulated, it was taken as read.

Mr. Allan was called upon to deliver some further observations with reference to his scheme, and he stated that several reasons existed why co-operation of veterinary surgeons should be brought about with a view to encouraging dairy farmers to take up the scheme.

The building up of a tuberculin-tested herd, he said, resulted in great saving, whilst the scheme, if successfully carried out, would eventually lead to clean herds, the stepping stone to eradication.

Mr. Snaith remarked on the desirability of some such scheme, but failed to see how it could be brought about without some sort of subsidy. Progress, he thought, would be slow and the question of public abattoirs would undoubtedly arise, their non-existence rendering the disposal of reactors difficult.

The matter was one of segregation, in the estimation of Mr. Pickering, who mentioned that in some places only one byre was used and that the selling out of reactors was hopeless. One or two things, he said, were being ever stressed—disinfection, for example. His experience had been that occasionally the best byres were the worst for tuberculosis. An expert, whose opinion he had sought, had been unable to give him a reason. It was Mr. Pickering's opinion that disinfection should not rest with the cleansing of byres, etc., but should extend to anything, even such matter as dung, with which animals might come into contact.

His conviction was that in the carrying out of such a scheme the farmer should be put to as little expense as possible. A start had to be made, however, and Mr. Pickering stressed the importance of obtaining propaganda from the National Farmers' Union.

Mr. Mitchell reminded the meeting that the scheme was concerned purely with young stock. He pointed out that the scheme was slightly idealistic and that it should be remembered that they were in a position to choose their farmers, a point to be stressed by pointing out that it was almost more important to choose the man than the premises.

Young calves, tested at, say, six months old or even younger, should, in Mr. Stewart's opinion, be cleared off to a field with a shed where there was no risk of infection for the first two years of their lives, and would thus form the nucleus of a tubercle-free herd.

Speaking in reply to Mr. Pickering's suggestion of propaganda from the National Farmers' Union, Mr. Allan mentioned that actually a list of farmers willing to take up the scheme in East Durham was already drawn up, the premises being quite suitable for the purpose. Regarding West Durham, about six farms together had been offered, the idea being to form an area.

Mr. Stewart accorded Mr. Allan a good deal of credit for originating the scheme, which in his opinion had a foundation of real merit.

He then mentioned his experience with a scheme, rather similar to the present one, for the control of contagious abortion. The question of disposal of infected animals had, he observed, always been a very ticklish problem. The North of Ireland Veterinary Department had been conducting some tests on immunisation against tuberculosis and he expected that the White Paper report to be published some time this autumn might prove interesting, if not important. Mr. Stewart suggested writing to ask when the report was due, as material assistance might be derived from its perusal.

Mr. Stewart thought that not only was the co-operation of the county staff essential, and the co-operation of the National Farmers' Union, but, further, the co-operation of the landlords was a desirable feature. The goodwill of the landlord would make a heavy task lighter.

Mr. Mitchell expressed surprise at the fact that only tested bulls were to be used. He thought the scheme was one where breeding took place from both tubercle-free cattle and infected cattle. The testing of calves at six months was a safeguard for the rest of the herd, so actually any bull would serve the purpose.

In many of the dales premium bulls were used, and these were all tested before purchase. Mr. Mitchell therefore could not see much point in testing bulls so far as the scheme was concerned.

After further advancing the discussion on costs, Mr. Snaith raised the question of infected animals in the Grade "A" herd, to which Mr. Rider replied that the new Milk (Special Designations) Order would alter the whole question of Grade "A" herds in that it would not insist on the removal from the herd of reactors to the tuberculin test.

Mr. Elphick said it was undoubtedly correct

to start with the calves. Careful handling and strict hygiene would go far towards building up free herds.

With regard to costs, Mr. Mitchell suggested that of the four tests proposed perhaps one could be obviated, especially if premises were under observation and where isolation was conducted in reasonable fashion. He suggested that tests be conducted one at six months, one at a year and one before the animal comes in calf. This would reduce the costs somewhat without prejudicing the interests of the scheme. Mr. Stewart mentioned, as an alternative, dispensing with the test before service.

Mr. Rider said that he was partly responsible for instituting the second test, mentioning that his experience was that with the first test it was probable that as many as 30 per cent. might react, this number including animals two to three months old or even younger. He had known of calves passing one test and failing to pass a second applied 73 days after the first. He maintained that the second test was the essential one.

After further discussion, the draft proposals were referred back to the Council, with instructions to amend the wording where necessary to conform with the views of the meeting, and afterwards to approach the local branch of the National Farmers' Union.

Clinical Cases.—Mr. Snaith produced a small specimen that he thought might be of interest to younger members. The specimen was a piece of skin that had come off a calf, that shown being only a quarter of what had been the result of treating the animal for warts with arsenic paste.

Mr. Hill then showed a specimen from a Guernsey calf four days old, which had died. On *post-mortem* examination the kidneys were greatly enlarged and hæmorrhagic, and the ureters were found to be totally blind.

Membership of the Council

Under "Any Other Business," Mr. Oliver urged that our Divisional representatives to the N.V.M.A. should know everything that took place at these meetings, and that they should perhaps be *ex-officio* members of the Council of the Division. It was decided to remit to the Council for their consideration the present rule whereby two members of Council retire annually for one year.

The meeting then terminated.

J. R. Rider, *Hon. Secretary.*

The number of producers now on the Milk Board's accredited producers' roll is 12,866. Cheshire, with 1,854, and Staffordshire, with 1,582, easily head the list.

Notes and News

The Editor will be glad to receive items of professional interest for inclusion in these columns.

Diary of Events

Dec. 4th.—Meeting of the Lancashire Division, N.V.M.A., at Manchester, 2.30 p.m.

Dec. 4th.—Annual General Meeting of the Scottish Metropolitan Division, N.V.M.A., at the Royal (Dick) Veterinary College, Edinburgh, 2.30 p.m.

Dec. 5th.—Meeting of the Central Division, N.V.M.A., at the Conway Hall, Red Lion Square, London, W.C., 6.30 p.m.

Dec. 5th.—R.C.V.S. Written Examinations.

Dec. 6th.—Final Oral Examinations commence in Dublin.

Dec. 7th.—Meeting of the North of England Division, N.V.M.A., at Birtley (demonstration), 2.30 p.m., and Plawsworth (business), 4.30 p.m.

Dec. 9th.—Meeting of the Editorial Committee, N.V.M.A., at 2, Verulam Buildings, Gray's Inn, W.C.1, at 4 p.m.

Dec. 9th-20th.—Oral Examinations at Dublin, Glasgow, Edinburgh, Liverpool, London.

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Jan. 8th.—R.C.V.S. Committee Meetings. V.V.B.F. Council Meeting.

Jan. 9th.—R.C.V.S. Committee Meetings.

Jan. 10th.—R.C.V.S. Committee and Council Meetings.

Sept. 14th-18th.—N.V.M.A. Annual Congress, Scarborough.

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Victoria Veterinary Benevolent Fund

Christmas Appeal

The Officers of the Victoria Veterinary Benevolent Fund appeal for Donations to enable them to send Christmas Gifts to the 40 widows and infirm members of the profession who are receiving assistance from the Fund. The assistance given varies from 10s. to £1 a week—sums which obviously cannot suffice to keep them even in the bare necessities of life. It is desired to send each recipient an extra grant just before Christmas to enable them to obtain some little extra comfort for the winter.

Donations, which will be thankfully received, should be sent to the Secretary of the Fund at 10, Red Lion Square, London, W.C.1.

PERSONAL

All-Ireland Tribute to Professor Craig

Professor J. F. Craig, M.A., M.R.C.V.S., Principal of the Veterinary College of Ireland, at a dinner given in his honour at the Metropole, Dublin, on the evening of Saturday, November 16th, was presented with a silver tea set by the members of the veterinary profession in Ireland and the graduates of the college. Mrs. Craig was presented with a beautiful grandfather's clock. Professor Craig, who has been Principal of the college since 1919, has been appointed to the Chair of Pathology in the University of Liverpool.

Mr. Sean O'Donovan, President of the Veterinary Medical Association of Ireland, in making the presentation, said that they wished to tender to Professor Craig an expression of the esteem and reverence in which he was held by his colleagues. Professor Craig had received many such tributes, but he hoped that he would value that one highest of them all.

Professor Craig, in responding said that he noticed that the company was very representative. There were people present both from the North and the South. He was glad that his veterinary friends were distributed throughout the world. Contributions towards the presentation, he was delighted to see, had come from graduates of the college, not only in Ireland, but in England and South Africa.

Professor J. J. O'Connor, of the Veterinary College, Dublin, proposed the toast of "Professor and Mrs. Craig."

In supporting it, Mr. P. J. Howard, of Ennis, said that Ireland always had a happy knack of "assimilating any foreigner who came to her and settled down amongst the Irish people. Although Professor Craig had been "imported" he was now an Irishman, having imbibed most of the little peculiarities of Irishmen—although he might like to deny that. That was not the first time that they had had to give their best to another country. They certainly were doing that now.

Mr. J. H. McCrea, Londonderry, offered, on behalf of the profession in Northern Ireland, their heartiest congratulations to Professor Craig on his appointment.

Replying, Professor Craig said that he did not want that function to be looked upon as a farewell one. He would be always at the disposal of the profession in Ireland for consultations on matters of interest to the profession.

Mrs. Craig also replied.

Later a well-attended dance, organised by the Students' Union of the College, was held in the Metropole Ballroom, and during the evening Professor Craig was presented with a bookcase, by Mr. J. Daly, on behalf of the students of the Veterinary College.

Appointment. — Mr. Christopher Munro, M.R.C.V.S., Londonderry, has been appointed veterinary surgeon for the Lewis area of Ross-shire. A native of Glasgow, Mr. Munro is a speaker of Gælic. He has had previous service in Lewis.

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HOLLAND (LINCS.) COUNTY COUNCIL AND VETERINARY INSPECTION

At a recent meeting of the above county council, protest was made against the recommendation of the Public Health Committee for the appointment of a full-time veterinary surgeon under the Milk and Dairies Order at a salary of £500, rising by increments of £25 per annum to £600.

Alderman Clark said there was no county where the veterinary inspectors had done their work more conscientiously and better than in Holland. It was absurd to ask for a full-time veterinary inspector, and he moved that the minute be deleted.

Councillor Wain said the committee looked upon the matter as being very important, and they were unanimous in their recommendation.

Alderman E. Richardson said he did not know of any county where the veterinary inspection was better. If they had a whole-time officer probably he would not do the work as well as it was done at the present time. He could not see the point of the recommendation, and moved that the matter be referred back or deleted.

Councillor Mountain supported the proposition that the matter be referred back. He was confident that the Committee had taken the wrong step in making that recommendation. He was not sure, and was not going to suggest, that improvement could not be brought about, but he maintained they would be better served by veterinarians in the county than by one or two whole-time men. Every farmer and owner of animals had his own particular veterinary surgeon, who was a friend as well as an adviser. They had done their work well.

Councillor Wain said the majority of County Councils employed a full-time veterinarian. The recommendation would not mean an extra cost of £500 per annum, because the present part-time men were paid something in the region of £200 a year.

Alderman Kitwood said there was a great division of opinion in the county council on the matter, and he would advise the Chairman of the Committee to reconsider the matter in order that the council might be supplied with more data than they had at the present time so that they could come to a reasonable solution of what many regarded as a great question.

Alderman Clark did not agree, and asked that his amendment, asking for the deletion of the minute be put to the meeting.

The amendment that the minute be deleted was carried by a big majority.

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PAYMENT FOR GRADE "A" TESTS

The Ministry of Health is considering whether an arrangement can be made whereby the fees charged by the majority of local authorities for veterinary inspections and bacteriological tests in connection with the issuing of Grade "A" milk licences, can be remitted.

At present, says the *Farmers' Weekly*, 20 county councils make no charge for veterinary service or bacteriological examination. Four counties charge for all services, and in the remaining areas the producers pay part of the cost.

The Ministry is at the same time considering the representations made by the County Councils Association and the Association of Municipal Corporations that the additional cost of veterinary inspections made necessary by the accredited milk scheme, should be met by Exchequer grants and not by the local rates.

The financial questions are being considered in relation to the representations made to the Ministry of Health that there are wide divergencies in the interpretation of the Grade "A" licence conditions by County Councils and other

local authorities, and that when the new Milk (Special Designations) Order comes into force, the practice in the counties should be uniform.

Some counties are penalised, it is claimed, because large numbers of producers are debarred from obtaining Grade "A" licences—and therefore the Milk Board's accredited milk premium—by an unduly severe interpretation of the regulations by the local authorities.

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"GRADE A" MILK EXAMINATIONS IN LEICESTERSHIRE

In Leicestershire, before a "Grade A" licence is granted, three successive samples of milk must be produced that are within the bacteriological standard for this grade. In connection with the Milk Marketing Board's "Accredited Roll" scheme and the issuing of "Grade A" production licences, the first 900 samples of milk examined in the Leicestershire County Laboratory show the following results:—

	Per cent.
42·7 per cent. contained less than 10,000 organisms per c.c.	(18)
24·2 per cent. contained between 10 and 30,000 organisms per c.c.	(17)
23·7 per cent. contained between 30 and 200,000 organisms per c.c.	(45)
9·4 per cent. contained more than 200,000 organisms per c.c.	(20)
85·6 per cent. contained no *B. coli* in 1/10th c.c.	(60)
2·4 per cent. contained *B. coli* in 1/10th, but not in 1/100th c.c.	(9)
12·0 per cent. contained *B. coli* in 1/100th c.c.	(31)

Taking the bacteria count only, 90·6 per cent. came within the required standard and on *B. coli* content 88 per cent. were within these limits.

The figures in parentheses show the results of 1,181 examinations of samples of ordinary milk "as delivered to the consumer" in Leicestershire during 1934. Considering that there was then no financial inducement, the results were quite good, but a comparison with the 900 samples examined in connection with the "Accredited Roll" shows the value of the scheme in the task of producing a "cleaner" milk.

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GLASGOW VETERINARY COLLEGE

Annual Distribution of Prizes

A grant of £1,000 from the Carnegie Trustees to be spread over a period of five years, in aid of equipment, was announced recently at the annual distribution of prizes to successful students of Glasgow Veterinary College, and the Chairman of the Governors (Mr. Alex. Murdoch, C.A.) expressed the hope that the Government, having deprived the College of annual grants for ten years, would now make a substantial capital grant towards necessary improvements.

The prizes were distributed by the Earl of Home, LL.D., one of the honorary vice-presidents of the College. Mr. Alex. Murdoch presided, and among others present were Bailie Kenneth Muir Simpson, Councillor Donald C. Fletcher, Mr. Hugh Begg, F.R.C.V.S., Major Douglas, Ayr, Mr. James Austin, LL.B., secretary and treasurer, and a numerous company of county council representatives. In the absence, through indisposition, of Principal A. W. Whitehouse, Professor William Robb presented the successful students with their prizes.

The Chairman said that the College was prospering, despite the withdrawal of the Governmental grants ten years ago. They were grateful to the Corporation of Glasgow, to county councils, to the Highland and Agricultural Society, and other bodies for their continued support. In the last session of Parliament, in reply to a question, the Secretary of State for Scotland had stated that the position of the College in 1935 was pretty much the same as it was in 1925, when the State grant was withdrawn. That answer was based on wrong information, and the secretary of the College and himself had addressed a letter to the Secretary for Scotland, giving him the facts. Whereas in 1925 they had about 80 students, to-day they had over 260 students. He understood that the Royal (Dick) Veterinary College in Edinburgh was unable to take any more students, a circumstance that proved conclusively that the Constable Committee's view that one veterinary College in Edinburgh was adequate for Scotland was a mistaken one. The veterinary profession was not overcrowded, and if the Government would now come along with a substantial capital grant they could proceed with necessary improvement to meet the demands upon the College.

The Medal Winners

The following are the winners of the silver medals for the year:—

First year course.—Medals in Chemistry and Biology—James L. Shaw. Medal in Chemistry—Miss M. H. Weddell. Medal in Biology—Ian Blench.

Second year.—Medals in Junior Anatomy, Physiology and Histology—Charles M'Nulty. Medal in Animal Management—George Wyse.

Third year.—Medals in Senior Anatomy—D. J. Macaulay. Silver medal in Pharmacology—D. S. Campbell. Silver medal in Veterinary Hygiene—John Birrell.

Four-year course—Class C.—Silver medals in Pathology, Materia Medica and Hygiene—J. F. C. Swan.

Gold medal presented by Governors to student gaining highest aggregate in all professional examinations and silver medal in Veterinary Medicine—D. M. Cochrane. Silver medal in Veterinary Surgery—T. F. F. Barr. Silver medal in Veterinary Surgery—J. J. Murdoch.

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COMMISSION ON NUTRITION

The Expert Commission on Nutrition appointed by the Health Committee of the League of Nations met on Monday morning last at the London School of Hygiene and Tropical Medicine. Those present were:—

France.—Professor L. Alquier, Directeur de l'Institut d'Hygiene Alimentaire, Paris; Professor L. Lapicque, Professor of Physiology at the Laboratory of Physiology, Sorbonne, Paris.

Scandinavia.—Professor Axel Hojer, Generaldirektor, Medicinalstyrelsen, Vallingatan 2, Stockholm.

United Kingdom.—Professor Cathcart, Professor of Physiology, Glasgow University; Professor E. Mellanby, Professor of Physiology and Biochemistry at Sheffield University and Secretary-General of the Medical Research Council, London; Sir John Boyd Orr, Director of the Imperial Bureau of Animal Nutrition, Reid Library, Rowett Institute, Aberdeen.

United States.—Professor E. V. McCollum, Professor of Biochemistry, Johns Hopkins University, Baltimore; Dr. Mary Schwartz Rose, Columbia University, New York; Dr. W. Sebrell, Chief of the Department of Nutrition, National Institute of Hygiene, Washington, D.C.

U.S.S.R.—Professor Sbarsky, Director of the Central Nutrition Institute, Moscow.

The Commission elected Professor Mellanby as chairman and Dr. McCollum as vice-chairman.

A statement was presented on the origin of the studies of the question made under the auspices of the League of Nations. After a general exchange of views the Commission decided to draft a statement on scientific principles governing dietaries of certain population groups—namely, women during pregnancy and lactation, infants, school-children, and adolescents up to the age of 21.

Two sub-committees—one on energy-producing substances, under the chairmanship of Professor Cathcart (members: Professors Alquier, Lapicque, Sbarsky and Sobrell, with Dr. McGee of the Ministry of Health as secretary), and the other on non-energy-producing substances (such as minerals, salts, vitamins, etc.), under the chairmanship of Professor McCollum (members: Professors Hojer and Mellanby, Sir John Boyd Orr, and Dr. Schwartz Rose, with Dr. Harriet Chick of the Lister Institute as secretary)—were entrusted with the task of drawing up detailed recommendations which will be submitted to the plenary commission at a later meeting.

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THE NATIONAL STUD

Informal discussions have taken place between representatives of the United Kingdom Government and of the Government of the Irish Free State regarding the position and future of the National Stud in Co. Kildare, which, since it was presented by the late Lord Wavertree, has been carried on under the management of the Ministry of Agriculture.

As a result of these discussions, a number of questions are being examined, and no decision is likely to be reached for some time.

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HUNTERS' IMPROVEMENT SOCIETY

Presiding at a recently-held Council meeting of the Hunters' Improvement Society, Lord Middleton stated that the Thoroughbred and Hunter Show would be held at the Royal Agricultural Hall, London, on March 17th, 18th and 19th, 1936. The schedule of classes for the hunter section of the show was passed for press, indicating that £875 would be awarded in the 16 classes, covering all ages of young hunter stock and riding classes.

Light Horse Breeding.—The Council (said the President) had now heard with pleasure that the War Office and the Racecourse Betting Control Board will again renew their grants for the encouragement of light horse breeding in 1936. Therefore 68 premiums of £125 each for thoroughbred stallions to travel England, Scotland and Wales, covering half-bred mares at a nominal fee, will again be awarded.

The schedule of classes and the number of premiums to be allocated to each county will be issued shortly, and it will be practically identical with the last show. In order to encourage the purchase of younger stallions, the Council will continue to offer special premiums of £200 (inclusive) for the 1936 season, to stallions ten years old or under on January 1st, 1936. These special premiums will be awarded to the Champion Stallion and Reserve Champion Stallion, irrespective of their age, but will otherwise be confined to the younger stallions. The exact number of these special premiums will be dependent upon the quantity and quality of the entry of young horses received for the show, but unless the Judges decide to withhold award through lack of merit, not fewer than ten special premiums will be awarded.

Brood Mare Scheme.—The report for the year indicated that the Society had now 164 mares located with reliable custodians. Of these 135 had been served this year, 16 had been put out too late for service, and 13 had not been served for reasons explained to the committee. Of the 114 mares that were served last year, 66 had produced foals, and 48 had proved barren. The Chairman (Captain J. Bailward) stated that since the inauguration of the Brood Mare Scheme in 1924 a grand total of 286 mares had been under the Society's control, and that 431 foals had been obtained from these mares.

Hunter Stud Book.—It was reported that Vol. 14 of the Hunter Stud Book would be issued early in the New Year. The entries received for this book numbered 975, but as the Editing Committee were anxious to include as many entries as possible in this book, as Vol. 15 would not be issued for another three years, it was decided to extend the period for the acceptance of entries.

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"MECHANISED" VETERINARY SERVICE

"It is interesting to trace the effects of 'mechanisation' on the veterinary service," says a well-informed writer in *The Warrington Guardian*. "At first sight, it might be thought that the introduction of mechanisation means the elimination of the horse from the service. This is far from being the case. The number of horses employed by the Army is, of course, greatly reduced; but those that remain are of increased value both economically and in a military sense. The value of the horse on active service has been proved by experience. A most noteworthy example of this fact was seen in the campaign in Palestine in 1918.

"The way in which the Army Veterinary Service has mechanised itself is as follows: It has provided trailers capable of accommodating two horses. The trailers are so constructed that they may be attached to any motor vehicle. The effect of this change is that a horse casualty occurring in a forward area is collected and transported quickly by the Mobile Veterinary Section to the Veterinary Evacuating Station, and so to the Field Hospital. If one compares this with the old method by which horse casualties either had to walk, or, if seriously injured, be transported by a slow moving horse-drawn ambulance, to a veterinary unit, one realises that the era of mechanisation has certain advantages from the equine point of view. Added to this is the fact that horse casualties in the forward area are a serious encumbrance to the circulation of traffic and their expeditious evacuation from that point of view is important."

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LOST AIREDALE FOUND DYED: THEFT CONVICTION QUASHED

Thomas James Mayo, whose address was given as Lordship Lane, N., successfully appealed at the Middlesex Sessions recently against his conviction and a sentence of six months' imprisonment at Hendon on October 3rd on a charge alleging the theft of a dog. In the result the conviction was quashed and Mayo was discharged.

The dog, which belonged to Mark Isaac Simons, of Golders Green, was missed on September 1st. On September 12th, according to the evidence, Mayo asked the licensee of a public-house in Whitechapel if he could find a good home for an Airedale. The dog was brought

along on September 15th, and the licensee paid Mayo 30s. A day or so later, when the dog was being taken along an East End street for resale, a friend of Mr. Simons saw it. Mr. Simons came along and, although the dog had been dyed a mahogany colour, he identified it, and the man with the dog was arrested, only to be released, and Mayo was arrested in his stead. Mayo told the police that he bought the dog in Club Row.

Mr. Frederick Levy, for the appellant, urged that the charge against Mayo of stealing the dog was not true. He emphasised the time which had elapsed from the day the dog was missed until it was found in the East End—14 days.

The Chairman (Sir Thomas Forster, K.C.), giving the decision of the Court, said that the point was as to whether the possession of the dog was sufficiently recent as to bring the case within the well-known principle that if a man was found in recent possession he might have obtained the goods recently as a thief. In the present case the Court thought that the period of 14 days was too great for them to apply that principle. That being so, the appeal must succeed.

As there were circumstances which justified the inquiry the Court could not allow the appellant's costs.

Mayo was discharged.

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CANCER RESEARCH

According to the twelfth annual report on its work, presented at the annual meeting held at the House of Lords, with the Duke of York in the chair, on Saturday last, the British Empire Cancer Campaign has during the year made grants for cancer research amounting to £32,000. The money is being spent partly upon purely experimental research into the causes of cancer, and partly on attempts to improve the present methods of treating the disease.

It is reported that partial success has now been achieved in the attempts to extract carcinogetic substance from the chemicals formed naturally in the body, and also to produce such substances synthetically. A carcinogetic agent has been produced synthetically which is closely related to cholic acid, the chief acid present in human bile. Whether such a substance as this synthetically produced carcinogetic agent can really be formed naturally in the body remains still a matter of doubt.

On the biological side, it is reported that a number of experiments have been carried out during the year into the natural history of warts produced in mice by painting them with tar. It was found that the warts could be divided into two groups, those which grew slowly and regularly, and those which grew much faster and not so regularly. Examination showed that the slow-growing warts were generally innocent in character, while the rapidly-growing ones were almost always malignant. An intermediate stage was also observed where the warts were sometimes malignant and sometimes innocent. The conclusion reached was that the growth-rate of tumour-cells might, alone, determine the question of innocency or malignancy. This might prove to be a very important finding, as hitherto no satisfactory explanation of the difference between innocent and malignant tumours has been found. Some success had also attended the efforts to find some substance which, when injected into the blood, would increase the sensitivity of tumours to irradiation with X-rays.

Last year good results were obtained by a special method of using deep X-rays in cases of cancer of the œsophagus, and disappearance of the tumour was effected in many cases. This work had continued, but the method had had to be modified because of injury to the lungs in a large number of cases. It now appeared that serious injury had been avoided to a large extent, but the results, with regard to the disappearance of the primary growth, were not quite so satisfactory.

Complete unanimity had been reached in favour of the scheme to form a Clinical Cancer Research Committee in association with the teaching hospitals. Its scope would be limited at first to London, but if the scheme were successful it would be extended throughout the country and the Dominions.

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SHORTHORN AMALGAMATION

The council of the Dairy Shorthorn Association has approved a draft agreement for the amalgamation of the association with the Shorthorn Society as from December 31st next. The agreement will be submitted for approval to a special general meeting of members on Monday, December 9th, at 16, Bedford Square, W.C., and members who may not be able to attend the meeting are to be invited to express their approval or disapproval of the scheme by voting card.

With the notice convening the special meeting the council have sent a letter detailing the advantages that should result from amalgamation. These include efficiency and economy in administration, better offices, and reduced subscriptions from Dairy Shorthorn breeders.

The name Shorthorn Society of the United Kingdom of Great Britain and Ireland is to remain unchanged. It is proposed that Mr. Leonard Bull, acting secretary of the Shorthorn Society, shall be appointed secretary, and Mr. Arthur Furneaux, secretary of the D.S.A., assistant secretary.

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DROP IN SCHOOL MILK DEMAND

"It is rather melancholy for those who are propagating milk consumption as the cure for ilka ill, to hear from the Lanark County Education Committee that the school children of that county are getting "fed-up" with their daily lactic ration," says the *North British Agriculturist*. "It would appear that the number of school children taking milk has fallen by one-third. In February, which was the first complete month of the scheme, the average daily number of children receiving milk at school was 64,890. In September last the figure had fallen to 46,122, which included 2,135 children attending schools who did not come into the scheme until after February. Amongst the reasons given for this lapse from dietetic virtue are that the novelty of taking milk has worn off, interference with the children's normal appetite at the mid-day interval; sickness alleged to be due to taking cold milk; instances of sour milk, or milk alleged to have been contaminated, and also parents finding difficulty in meeting the cost of daily supplies. All this is certainly very disappointing, and will no doubt so be specially regarded by the Milk Marketing Board, who had dreams of school supplies solving the surplus milk problem."

WARBLE-FLY DRESSING

A meeting to discuss the proposed compulsory dressing of cattle against warbly-fly will be held in London in the near future between representatives of the Ministry of Agriculture, the Northern Ireland Department of Agriculture and the Irish Free State Ministry of Agriculture.

The object of the conference will be to achieve the application of an Order which will compel the use of a uniform method of dressing throughout the United Kingdom and the Irish Free State.

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THE CONTROL OF RABIES

The second leading article of the issue of the *British Medical Journal* of November 23rd, contains the important reminder that it is just 50 years since Pasteur introduced the prophylactic treatment of rabies, and states that the occasion has been suitably commemorated by the issue of a special number of the *Annales de l'Institut Pasteur* (October 25th, 1935). "There are good reasons for regarding Pasteur's work as one of the greatest achievements in medicine, both because it involved a tremendous but correct assumption then incapable of proof—namely, that the disease was due to an ultra-microscopic organism—and because the method of prophylaxis was so soundly based and so practically efficient that the ensuing 50 years, with all the greater knowledge that they have brought, have seen it improved only in detail. That this country should be entirely free from rabies, thanks to quarantine regulation for animals of which only the ignorant complain, should not blind us to the fact that this disease is an ever-present if remote danger over a very large part of the world, including countries near at hand, where constant vigilance and the provision of facilities for treatment alone prevent a considerable mortality from it. It may be news to some that the disease exists in the United States, but a recent report by Olesen* is entitled "The Control of Rabies in New York City," and contains facts and opinions of no little interest. All dogs in public places in New York are subject to a muzzling order which is apparently not by any means strictly observed, and all dog bites have to be notified, whereupon the offending dog is secured if possible and kept under observation for seven days, while the bitten individual is subjected to antirabic treatment not only in cases when the dog concerned is rabid, but in others when the animal cannot be traced, especially when the bites are severe or involve the face. During last year no fewer than 19,443 dog bites were notified in New York and 44 rabid animals were discovered, this being a much smaller figure than that given for the period 1926-28, when the numbers ran into several hundreds. That there were only two deaths from rabies during last year and none during the three preceding years is evidently due to the efficiency of the preventive service; from 40 to over 100 deaths are recorded for the whole of the U.S.A. for each year since 1908. The antirabic service is expensive, and Olesen suggests that dog licences should be made to pay for it; these are at present issued under a charter from the State of New York by the American Society for the Prevention of Cruelty to Animals, who use the proceeds for their own purposes, a curious arrangement vaguely reminiscent of the royal granting of monopolies in Elizabethan England.

"A review of the recent literature of rabies by McKendrick† is of more comprehensive interest. It includes an admirable discussion of the merits of different variants of Pasteur's prophylactic method, based largely on the important and extensive data published this year by Van Stockum, on the basis of experience in the East Indies. This author concludes that the immunising power of carbolised virus is inferior to that of preparations containing living but attenuated virus, but McKendrick disagrees with her interpretation of her own data. Opinion as to the causation of "paralytic accidents" following antirabic treatment appears to be veering again towards the conclusion that these are due to the action of the living virus itself, and do not represent a mysterious effect exerted by the constituents of injected nervous tissue, as was suggested by Stuart and Krikorian. This complication is fortunately very rare; 22 cases only are recorded in the reports of Pasteur Institutes for 1932 among 115,959 treated persons. These are only some of the principal features in the recent literature of rabies, a subject in which our lack of interest is due to our isolated position and the measures taken to protect it. Those whose work will take them to other less fortunate parts of the world will do well to familiarise themselves with at least the broad principles of antirabic control and the practical measures by which they are given effect."

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RABIES REMINISCENCE OF A BOUNDARY MARKER

In his Inaugural Address as Chairman of the Royal Society of Arts, Colonel Sir A. Henry McMahon (reports *Public Opinion*) revealed the difficulties and dangers of boundary marking in remote districts.

"One of the most uncomfortable of our experiences occurred in our last winter in Seistan," said Sir Henry.

"Hydrophobia, a disease almost unknown in that country, suddenly broke out among the jackals which abounded there. Several of our men were attacked at odd times when out in the jungles, but of those bitten fortunately only one died from madness. Then from the jackals it spread to the dogs with which the country swarmed, and their owners were driven in panic to destroy them. Many mad dogs were killed in our camp.

"Still worse was to come, for, lastly, the rabies spread to the wolves; these proved a greater danger than either jackals or dogs, for when smitten with madness they travelled far and wide, attacking man and beast. Careful watch had to be kept round our camp at night, and several mad wolves were killed; but one night, in the midst of a wild blizzard, two mad wolves succeeded in entering our camel lines and savaged everything they met. Luckily our camel men escaped, but next morning no less than 78 camels were found to have been bitten.

"Of these, in due course, no less than 46 went mad and had to be destroyed. A horse also which had been with the camels on that fatal night, and which had shown no signs of injury, suddenly developed madness one day and made an alarming attack on our camp."

* *Public Health Reports, U.S.A.*, 1935, I, 1087.

† *Tropical Diseases Bulletin*, 1935, xxxii, 605.

ARMY VETERINARY SERVICE

Director of Veterinary Services, Army H.Q., India

Brigadier H. S. Mosley, D.S.O., is vacating his appointment as Director of Veterinary Services at Army H.Q. in India and goes on two months' leave from December 3rd. His successor is Colonel H. C. Dibben.

London Gazette — War Office — Territorial Army Reserve of Officers

Nov. 19th.—Lt. P. N. C. Green, from 68th (S. Midland) Fd. Bde., R.A., to be Lt. (Nov. 20th).

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FOOT-AND-MOUTH DISEASE IN CHESHIRE

The existence of foot-and-mouth disease was confirmed on Tuesday last among cattle at Adlington, Macclesfield, Cheshire. The prohibition of movement of animals order affects an area lying in the counties of Chester, Derby, Stafford and Lancaster.

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H.M. STATIONERY OFFICE PUBLICATIONS

The undermentioned have been published recently. Copies can be purchased through any bookseller, or directly from H.M. Stationery Office, at the following addresses: London: Adastral House, Kingsway, W.C.2, and 28, Abingdon Street, S.W.1; Cardiff: 1, St. Andrew's Crescent; Manchester: York Street; Edinburgh: 120, George Street.

	Price Net. s.	d.	*Post Free.* s.	d.
Privy Council:—				
Agricultural Research Council:— Preservation of Grass and other Fodder Crops. Report by a Committee, September 30th, 1935. (A.R.C. Report Series, No. 1.) (88-2101-1-35)	1	0	1	1
House of Commons Bills:—				
24. Diseases of Animals (Therapeutic Substances) (as amended in Committee) ...	0	3	0	3½
Statutory Rules and Orders, 1935:—				
121. Diseases of Animals, Swine Fever (Belfast) Order	0	1	0	1½

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At to-day's anniversary meeting of the Royal Society, Sir William Bragg succeeds Sir Frederick Gowland Hopkins as President, while Sir Patrick Laidlaw—whose name is familiar to all our readers in association with that of Major G. W. Dunkin for research into the causation and prevention of canine distemper—is recommended for election as a member of Council.

Correspondence

All correspondence must bear the name and address of the contributor for publication.

The Editor does not hold himself responsible for the opinions of his correspondents.

Letters to the Editor should reach the Office not later than by the first post on Tuesday morning for insertion in following Saturday's issue.

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R.C.V.S. COUNCIL ELECTION MANIFESTOS

To the Editor of The Veterinary Record

Sir,—The suggestion contained in Mr. Priestley's most sensible and timeous letter in your issue of November 16th carries a strong appeal for those who take interest in veterinary politics. However, the resolution of the N.V.M.A. Council of July 3rd, 1934, quoted in your appended note, which provides "That election addresses be accepted for publication upon payment, as advertisements, being made for them" will, for the moment and so long as it stands, quite paralyse any promulgation of Mr. Priestley's suggestions.

It is obvious that at advertisement rates and on the assumption that a candidate's address, even if a little synoptical, would occupy a single column, a charge of £2 10s. would have to be met.

This strikes one as a rather excessive and arbitrary imposition on gentlemen who are willing to serve us at considerable expenditure in energy, time and money and one which they could well be excused escaping. *The Veterinary Record* could publish nothing more useful for the proper selection of future members of the Council than the views of candidates on important questions and if that be true, why this hampering motion?

By contrast, one thinks of the space (uncharged for) so often taken up by the publication of small talk in Divisional Reports sent on by secretaries and wonders if it is sufficiently edited at headquarters. Moreover, election addresses should prove as interesting and enlightening as some clinical cases that are published. Yet, for the former a heavy fee is exigible and for the latter liberal honoraria are paid.

As matters stand, the veterinary political views of many councillors on basic matters are more or less unknown to those who have supported their candidature.

Let us hope the Council of the N.V.M.A. will rescind a resolution so clogging to progress and (remembering that *The Veterinary Record* is for the profession and not the profession for *The Veterinary Record*) give free publication in future to the synoptical election addresses of candidates.

Yours faithfully,

Hugh Begg.

Elm Lodge,
Hamilton.
November 19th, 1935.

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To the Editor of The Veterinary Record

Sir,—I agree with Mr. Priestley's suggestion that nominees for the Council should in the future outline the policy which they intend to adopt and publish this in *The Veterinary Record*. Many of us vote blindly, knowing nothing of the nominee or what his policy is.

We should like to see more ordinary members of the profession on the Council—general practitioners.

Yours faithfully,

T. F. Hall.

Huntingdon.
November 20th, 1935.

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HEALTH

To the Editor of The Veterinary Record

Sir,—I was interested in the short report of Sir George Newman's address given on page 1414 of your issue of November 23rd. The words that impressed me most were the following: "We cannot ensure a healthy nation only by bottles of medicine, modern surgery and artificial immunisation. A fuller and deeper appre-

ciation of positive and instructive health is necessary."

The thoughtful veterinary surgeon will always appreciate the difficulties under which the human doctor works, and I would suggest a few points to indicate concentration of consideration and possible alleviation in connection with better health for humanity:—

1. Poor stock.

2. The foolish mortals who kill themselves to keep themselves.

3. The man who boasts that he never takes a holiday—more prevalent in the past than to-day.

4. The man or woman who has no hobbies outside his or her own work.

5. The individual who takes no exercise, who lives three quarters of his life in a motor car, and eats omnivorously.

6. Deep consideration of the question that "more people die of eating too much than too little."

7. As regards the curative area, there are a large proportion of men in both human and veterinary medicine that do not read enough and do not keep up-to-date in therapeutics.

8. "Unbalanced lives" (as Sir Josiah Stamp indicated in the best recent note I have seen on the subject) are accountable for many early deaths.

9. The idea that children and young people should be allowed to do as they like and never be instructed or advised by those who have "gone through the mill" and are wide, liberal and broad-minded in their views.

Yours truly,
G. Mayall, m.r.c.v.s.

Bolton.

The Editor acknowledges, with thanks, the receipt of the following:—

Communications from Mr. W. E. Blackwell (Towcester), Dr. H. H. Curson (Pretoria, South Africa), Major G. W. Dunkin (London), Mr. J. W. H. Holmes (London), Professor William C. Miller (London), Professor W. Kearney (Dublin), Major-General Sir John Moore (London), Captain A. W. Noel Pillers (Liverpool), Major A. A. Pryer (R.A.V.C.), Lieut.-Colonel Wakefield Rainey, and Captain J. Smith (Kenley).

Reports of meetings of the Mid-West and the Midland Counties Divisions, N.V.M.A., from Mr. C. E. Perry and Captain H. W. Dawes, respective Hon. Secretaries.

Advertiser's Announcement

The "Neo-Injector."

The ordinary method of administering calcium injections in the treatment of milk fever by means of a 50 c.c. syringe has been superseded by the "Neo-Injector" (Hewlett's) which has been successfully employed by a number of veterinary surgeons with the most satisfactory results. It avoids the repeated refilling of the syringe with its consequent disadvantages and maintains a steady flow under even pressure. The "Neo-Injector" consists of a 300 c.c. amber wide-mouth bottle with india-rubber cork through which two metal tubes project, connected on the one side by tubing with rubber bellows and the other with an adaptor and a stainless steel intravenous needle. The apparatus is also suitable for injecting normal saline solution, etc. The "Neo-Injector" can be sterilised and should a smaller quantity than 300 c.c. be required for use the flow can be instantly stopped by means of the clip provided.

A larger size, with 400 c.c. bottle is also available.

Diseases of Animals Acts

SUMMARY OF RETURNS

Period.	Anthrax.		Foot-and-Mouth Disease.		Parasitic§ Mange.		Sheep Scab.	Swine Fever.	
	Out-breaks con-firmed.	Animals attacked.	Out-breaks con-firmed.	Animals slaugh-tered as diseased or ex-posed to infection.	Out-breaks reported by the Local Authori-ties.	Animals attacked.	Out-breaks con-firmed.	Out-breaks con-firmed.	Swine slaugh-tered.
	No.	No.	No.	No.	No.	No.	No.	No.	No.
Period 1st to 15th Nov., 1935	22	28	—	—	1	2	48	77	53
Corresponding period in									
1934	15	17	19	2,488	2	4	50	105	37
1933	18	30	—	—	4	12	65	64	59
1932	14	14	2	184	1	1	30	36	17
Total 1st January to 15th Nov., 1935	320	373	48	11,624	91	210	336	1,776	1,049
Corresponding period in									
1934	333	377	52	6,248	106	176	542	1,528	874
1933	257	303	87	7,805	122	209	364	1,241	801
1932	292	358	15	1,282	112	173	234	1,423	693

Note.—The figures for the current year are approximate only.

§ Excluding outbreaks in Army Horses.